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Railway Freight Charges Scheme

THE request by the British Transport Commission for authority to raise railway freight, canal, and dock charges by 10 per cent, subject to a maximum rise of 10 per cent for merchandise by goods and perishables by passenger train, has been granted by the Minister of Transport & Civil Aviation, Mr. Alan Lennox-Boyd; it is to operate from March 1—later than was envisaged when the application was made at the New Year. The Minister in accordance with procedure consulted the Permanent Members of the Transport Tribunal sitting as a consultative committee; their findings are summarised in our Parliamentary columns. The additional £23,000,000 expected from the rate increase will barely cover the anticipated deficit on the operation of British Railways in a full year. Only some £6,500,000 of the £23,000,000 is to be regarded as helping to meet the cost of wage increases, as the extra £6,000,000 a year expenditure on the wage increases agreed since the application was made is to be found through the economy measures now being discussed between the Commission and the trade unions. The precariousness of the balance of the Commission's expenditure and income is shown in the consultative committee's report to the Minister; and an increase in expenditure, of which that of £2,500,000 a year on the forthcoming pensions scheme is only one item, is certain. In the circumstances it is hard to see what could have been done except increase freight rates, despite the risk of loss of merchandise traffic. To subsidise the railways would be economically unsound—apart from the element of subsidy of other industries already inherent in some low railway rates; and raising railway passenger fares was impracticable for the reasons stated by the committee. The effects of the 10 per cent increase, however, on the national economy are serious enough, and in the long run there must be increases in the cost of production and of distribution of goods for export. It is announced that coal prices will rise 2s.-4s. a ton on March 1, according to the distance from pithead to consumer, and this will add considerably to the outgoings of the electricity and gas industries, amongst others. On the other hand, the 10s. a ton limitation on the rise in merchandise rates will mitigate its effect on higher rated consignments over long distances. It must be remembered also that even after the increase now authorised the index of railway rates on a prewar basis of 100 will be 253, compared with the general index of wholesale prices of 323.

British Transport Loan

THE £80,000,000 4 per cent guaranteed stock 1972-77 issued by the British Transport Commission at a price of £101 per cent, for which lists opened and closed yesterday, is in addition to the £120,000,000 issued in November, 1952, with the same redemption dates. The prospectus states that the Commission estimates that in 1953 a working surplus of approximately the same order as in 1952, £4,500,000, has been earned. After the present issue a total of £252,839,365 will have been borrowed, leaving the Commission borrowing powers still unused to the extent of £22,160,635, which may prove insufficient. No details are given of the use to be made of these new funds, but it seems probable that they are needed to make good the difference between depreciation on cost basis provided in the accounts and the actual costs of asset replacements at higher price levels; in the Commission's accounts for 1952 it was stated that depreciation on the basis of replacement cost would have been £20,000,000 higher than the £16,000,000 allowed for on historic cost. The railways are suffering from paucity of capital expenditure, and the new issue by contributing to the efficiency of the railways will help them to pay their way and, it is hoped, dispense with the necessity for increasing their charges.

United of Havana Liquidation Proposed

A RESOLUTION to place the United Railways of the Havana & Regla Warehouses Limited in voluntary liquidation is one of five to be considered at an extraordinary general meeting which will follow the annual meeting on March 4. Stockholders are also to be asked to approve the sale to the Cuban Government of the assets and properties of the company and its subsidiaries for $13,000,000. This sale was concluded on December 1 and the purchase money has been paid. The accounts for the year ended June 30, 1952, now presented, are therefore termed as "merely of academic interest"; they show a deficit of £1,016,346 on working. The procedure for the distribution of monies arising out of the sale of the undertaking is governed by the scheme of arrangement referred to in our October 24, 1952, issue. An interventor appointed by the Cuban Government to manage the operation of the company in Cuba has remained in possession since June 10, 1949. Mr. R. G. Mills, the Chairman, in a statement accompanying the report, reviews the chequered history of the past few years and the negotiations conducted in the attempt to secure an equitable settlement. He believes that had the British Government agreed to a proposal to dispose of the railway to Cuba against payment in sugar, the proceeds from such a sale might have been greater than those from the sale now negotiated.

Using Transport Facilities

THE importance of using the most efficient form of transport for the purpose of any movement, and of keeping an open mind as to what may prove to be the most efficient, were stressed by Major-General G. N. Russell, Chairman of the Board of Management of British Road Services, in a recent paper to the Merseyside Section of the Institute of Transport. This is a subject on which, as a former adviser on movement and transportation matters to commanders during the last war, he speaks with authority from the transport user's, besides the transport provider's, point of view. Whilst he doubts that the economy of any country can afford to treat the various forms of transport save as complementary, he emphasises the advantages for the transport user—in the present stage of transport development in this country—of railways for trunk transport, and mentions the steps taken by British Railways and British Road Services since nationalisation to co-operate in long-distance freight haulage. As to the future, he accepts the challenge of the situation created by the Act of 1953, which the British Transport Commission with its railways and reduced road haulage fleet will be ready to meet and, he suggests, hold its own.

Overseas Railway Traffics

CANADIAN PACIFIC gross earnings for 1953 totalled $470,571,371, compared with $457,808,969 for 1952, but net earnings declined slightly from $28,930,780 to $28,884,572. In December, gross earnings were $39,022,941, against $39,554,937 a year earlier, while net operating income at $3,708,220 compared with $2,475,481. Taltal receipts for December were pesos 2,523,000, a decrease of 613,000 compared with 1952; the aggregate for the six months from July 1, however, at pesos 21,154,000 represented an increase of pesos 3,490,000 over the latter half of the previous year. Traffic receipts for January, 1954, were pesos 3,900,000, an increase over last year's figure of 1,143,000 Paraguay Central aggregate receipts for the half-year to January 1 were guaranies 26,392,729, an increase of 9,791,831 over the corresponding period of 1952-53. The traffics for the weeks ended from January 8 to February 5 have remained substantially above those for the corresponding weeks of last year. Costa Rica Railway receipts for December were colones 1,442,364, a slight decrease against those for December, 1952. The aggregate for the six months from July 1 was colones 8,681,366, an increase of 338,577 compared with 1952-53.

An American Study of British Transport

THE very similar ways in which British and American railways react to business depression are commented on by Mr. Thor Hultgren, of the U.S.A. National Bureau of Economic Research, in a recent study, the subject of a brief notice on another page. Despite the high degree of stability in the freight and passenger rates, he finds, a cyclical expansion in traffic has usually been accompanied by a rise not only in aggregate profits but in profits per unit of traffic, and a cyclical contraction by a decline in these profits. As in the U.S.A., diversion of freight traffic from rail to other forms of transport in Britain has been more rapid during general business contraction than during expansion; either the contraction induced shippers to seek lower costs more energetically or else road haulage rates and costs were more flexible. A main point of difference between the two countries has been in the productivity of their railways. Not only is manpower per unit of traffic volume far smaller in America, he reports, but the decline in this requirement has been far greater than in Britain. Mr. Hultgren attributes superior performance by U.S.A. railways, such as the rise between the wars in average freight train speeds, which remained virtually constant in Britain, to superior technological development as a result of expenditure on improvements; but he does not go deeply into the causes.

Pruning the Branches

A SHORT but comprehensive account of the factors to be considered in closing branch lines and the procedure followed before a decision to close is made, is given in the February issue of the British Railways Magazine; it is emphasised that " not a single mile of line, or the smallest station, is closed if there is the slightest chance of making it pay." Under the title " Pruning the Branches " editorial comment on this is made in the same issue by " The Man on the Line." He points out that many lines and stations were built because of the prospects held out by promoters which from the start have never earned their keep, and that with shifts of population centres and with new industries springing up in recent years away from the railway, buses and lorries have got in first. Branch line closing did not start with nationalisation: much was done in this direction between grouping, in 1923, and 1948, since when the process has been accelerated, resulting in economies of over £1,000,000 a year. This does not mean, he concludes, that the railways are dying on their feet; it means that they are moving with the times. Pruning moreover is done to promote vigorous growth.

Bridge Renewal at Shifnal

THE Western Region has carried out an interesting renewal of a bridge on its Paddington-Birkenhead line at Shifnal, Salop. The original cast-iron structure was over a century old, having been built by the Shrewsbury & Birmingham Railway, which was merged with the Great Western in 1854 after being for the whole of its brief existence a shuttlecock between the G.W.R. and L.N.W.R. during a period of their most intense rivalry. The Shifnal bridge, like the other works on the line, was made to carry the broad gauge, even though that gauge had not then penetrated further from Paddington than Oxford and Cheltenham. The new bridge has been constructed as two parallel, independent plate-girder spans, one carrying the up, the other the down line. The well decking is of precast concrete. In view of the restricted site—the bridge spans a main thoroughfare and there are buildings right up to the abutments—and the condition of the old structure, the renewal called for some unusual measures, as described on other pages; some of the cast-iron work had be cut up and lowered by tackle to road vehicles for removal.

Navigational Aid for All British Railways Ships

ALL the cross-Channel vessels operated by British Railways are to be fitted with the Decca Navigator, an electronic position-fixing device which was used first to determine accurately the objectives for landing craft on the Normandy beaches and was subsequently taken up commercially. Two of the former L.N.E.R. vessels were equipped with it as early as 1946, and 27 ships of the British Railways fleet now incorporate it. Mr. J. L. Harrington, Chief Officer (Marine & Administration), British Transport Commission, has described the device as a marvellous aid to position finding and said that its extension to the whole fleet will make for even greater punctuality of the cross-Channel services. Priority of installation will be given to the ships operating on longer routes. From the description of the system elsewhere in this issue, it will be seen that in essentials it consists of a group of land stations sending out continuous transmissions which are picked up by a receiver on the ship. From figures read off dials in conjunction with a standard chart specially gridded, the position of the vessel can be fixed precisely.

Two Classes in Channel Steamers

WHEN the s.s. *Arnhem* was brought into service on the L.N.E.R. Harwich—Hook-of-Holland night service in 1947, she was designed as a one class ship. Although she was provided with first class cabins on the upper and

second class cabins on the lower decks, the public rooms were available for common use by both classes of passenger. Subsequent experience has shown that one class ships are not popular on this route, and arrangements are being put in hand to convert the *Arnhem* to the same standard as the *Amsterdam* and the *Duke of York*, the sister ships operating this service. The alterations, some details of which are given on page 218, include conversion of the existing lounge and other accommodation into first and second class lounges and dining saloons. This shows that a considerable travelling public is prepared to pay for superior accommodation even on a relatively short journey—a factor to be borne in mind when contemplating alteration in railway passenger classes —and that the luxury of the public rooms used only for a few hours on a night crossing is appreciated by passengers.

Beyer Peacock Centenary

ONE hundred years of progress and development in locomotive building were marked last Tuesday by the reception held at the Savoy Hotel, London, by Beyer Peacock & Co. Ltd., and the première of a colour film depicting one of the firm's more recent and characteristic products.

In 1854, the private company of Beyer Peacock was founded by three principals, Charles Frederick Beyer, Richard Peacock, and Henry Robertson; and twelve acres of ground were purchased at Gorton, a suburb of Manchester, alongside the Manchester, Sheffield & Lincolnshire Railway. This was followed by further land purchases up to the limits of the railway and surrounding buildings, a total of about 30 acres, and the plant grew to the full extent of the site.

In this factory, the company has designed and manufactured all types of steam locomotives and during the two world wars the plant produced many different types of armaments. On foundations so closely associated with the original introduction of the steam railway engine, Beyer Peacock & Co. Ltd. has developed in parallel with the world's railway systems, and is proud of the contribution it has made both in locomotive design and production methods. The excellence of Manchester craftsmanship is well known, and locomotives bearing Beyer Peacock's name are to be found on railways in all parts of the world. Indeed, there are many still running today which were built over half-a-century ago.

The company's traditions of design and engineering craftsmanship have been carefully preserved. In 1902, it became a public corporation and is now many times the size of the original enterprise. Since 1932 Beyer Peacock & Co. Ltd. has pursued a policy of expansion into other engineering fields so that the Beyer Peacock Group now includes various wholly-owned subsidiaries with factories in East Anglia, Southern, and Western England. The manufactures of the group cover a wide range of mechanical and civil engineering products, industrial refrigeration, machine tools, agricultural and food machinery, peat harvesting equipment, and many domestic and export supplies. The association company of Metropolitan-Vickers-Beyer Peacock Limited has a new factory near Stockton-on-Tees for the production of electric, diesel-electric, and gas-turbine electric locomotives. The directors of Beyer Peacock & Co. Ltd. for many years have put into practice the maxim that principals of leading export firms should by personal contact familiarise themselves with their markets. Mr. Harold Wilmot, the present Chairman & Managing Director, has visited railways in many countries overseas and acquainted himself with the needs of and conditions met with on the railways there, as have his colleagues and senior officials of the firm. Another Beyer Peacock tradition is that of closely following the performance of the firm's products on the railways to which they are supplied, and complete records, forming an almost unique corpus of information, have been made of such performance by many locomotive types on a number of railways.

The name of Beyer Peacock has a world-wide association with its speciality, the Garratt articulated locomotive, introduced in 1907. Since that time many examples of this form of steam locomotive have been designed and built for varied and arduous conditions of overseas railways. History will record that the Beyer-Garratt locomotive represents a definite stage in the development of steam traction and provides the maximum possible power under the restrictions of local conditions.

A good example of the advanced stage of development of this type of locomotive is shown in operation in the film referred to above, entitled "Beyer-Garratt Locomotives on the New South Wales Government Railways." These locomotives, described in our issue of July 4, 1952, with roller bearings on all axles, mechanical stoker, cast steel frame beds, and power reversing gear, and a tractive effort of 60,000 lb. on the 4 ft. 8½ in. gauge, are an outstanding example of an economical method of increasing line capacity. The film, taken in New South Wales and at the Manchester factory, is a record in full colour of both the manufacture and the operation of these remarkable machines; there could hardly be a better and more self-explanatory record of British ingenuity, skill and craftsmanship in an industry in which these qualities have achieved so much for this country and for the development of railways overseas.

Railways from the Trader's Viewpoint

BY removing limitations on charging by the railways and restoring to private enterprise long-distance road haulage the Transport Act of 1953 allows industry to choose the form of transport best suited to its needs, a choice for which it has clamoured since 1947. In competing with road transport the railways are handicapped by such factors as having to buy their own land, maintain their own tracks and act as common carriers, but on the other hand, they have the advantage of being able to run large units with small crews. As Mr. M. F. Barnard, Chairman of the Traders' Co-ordinating Committee on Transport, pointed out in his recent paper "The Trader's Outlook on Railways" to the London School of Economics & Political Science, there is a limit to what the trader can pay by rail, even when the traffic cannot be carried by other means; high railway charges could cause either integration of works and factories to save intermediate carriage, or decentralisation of production by opening local factories to save delivery costs.

In railway reorganisation, industry favours a central authority for such functions as wagon design and building, and the distribution of locomotives and wagons. Traders do not wish to see any distortion of services purely to serve Regional interests. The railways have met praiseworthily the increasing demands for the transport of iron ore and steel over the last five years. But for the careful planning, building and distribution of the special wagons needed, and the scheduling of the necessary freight trains, the steel industry could not have reached its annual targets. There should be, he appeals, a commercial outlook by the railways not only in respect of services and charges but also of documents governing conditions of carriage, private sidings and warehousing. To consign by rail the trader must subscribe to thirty-three conditions of carriage; in respect of siding agreements, the obligations on the trader extend to his agreeing not to use competing services.

Industry wants to see the container business developed. It should respond readily to any proposals by the railways for more efficient handling on rail or at works. Recent proposals by them for a larger standard wagon for coal and minerals may alter the methods of business or call for improvement in terminal facilities belonging to industry; Mr. Barnard hopes that industrialists will not be slow in matching them to suit the larger wagons. By strengthening at low cost a 16-ton mineral wagon the steel industry has found that it would be possible to load in it at least 27 tons of iron ore. The resulting increase in revenue on a 30-wagon train would be more than 50 per

cent. The Government should authorise the capital expenditure necessary to bring the railways up to date and keep them abreast of scientific and other research. The 1954 rolling stock programme is described as "very encouraging."

A bankrupt, or even an inefficient or uneconomical railway system means bankrupt or uneconomical basic industries, affecting the whole economic life of the country. If one saves on carriage by using other than rail transport, one pays for it in the price of primary products, such as coal, gas, and steel, dependent on the railways for transport. The road haulier has to decide whether to cost each run of traffic, based on loadability, tonnage to be carried, whether it is regular or not, and whether there is a return load available. The successful competition of the railways must depend largely on whether they can compete in service and offer lower rates on either of these bases, do it quickly enough, and so differentiate between flows of traffic as not to disturb the whole flow of trade. Will the British Transport Commission approach industry for all-in agreed charges to cover all materials and finished products both for traffic by rail and road, Mr. Barnard asks, and can both traders and providers of transport examine in conference the problems of both sides, with particular reference to an overall increase in efficiency and economy, and the rates to be charged?

Developing an Atomic-Powered Locomotive

THE possibility that the American railways may be the first private industry in the United States to put atomic power to peaceful use is foreseen by Dr. Lyle Borst, of the University of Utah, who has been associated with the design of Atomic Energy Commission installations in the U.S.A. Five United States railways, several manufacturers, and physicists of the University have collaborated for a year to produce a design for an atomic-powered locomotive. From details which have been published the proposed locomotive would have a total horse-power of 7,000. It would have two units; the forward section, 80 ft. long, would have 12 axles to support the weight of the reactor, which, only 2 ft. wide, 3 ft. high, and 3 ft. long, would be housed and shielded by a massive steel container 4ft. thick and weighing 200 tons. The second 80-ft. unit would contain radiators to get rid of excess heat. Fuel would be a liquid form of uranium, and steam produced by the reactor would drive electrical generators which would produce power. At a conference of American railway officers and motive power specialists a "feasibility study" was presented at which the cost of a nuclear-powered locomotive using 11 lb. of uranium a year was put at $1,200,000, stated to be about twice the cost of a comparable four-unit diesel locomotive.

It would be instructive to know how closely this development is being followed in this country. Before the war diesel progress here was at best sporadic and tended to be unco-ordinated. It was on the Continent and, above all, in the United States, that its development was most rapid and spectacular. In the changed fuel economy of the immediate postwar years and profiting by technical progress in diesel design in the war, however, the British railway companies turned their attention just before nationalisation to the internal-combustion engine for main-line work. After considerable experience with diesel shunting units, the L.M.S.R. and the Southern Railway each put into service two main-line diesel-electric locomotives with engine and electrical equipment by the English Electric Co. Ltd., and the Great Western Railway, which in the 1930s pioneered the widespread use of diesel railcars in this country, decided on an even bolder experiment, with gas-turbine traction, which had then made some little progress in Switzerland and the United States. Of the two locomotives of this type which the G.W.R. ordered and which are now in regular service on the Western Region, one was built by Brown Boveri and the second by the Metropolitan-Vickers Electrical Co. Ltd.

At the time we commented that as Britain was leading the world in the development of aircraft gas engines there was no reason why, drawing on the experience of its aircraft turbine engines, it should not also seek to become pre-eminent in the field of gas-turbine locomotives.

Even though America has taken the lead in applying atomic power to propulsion—it has already launched a nuclear-powered submarine, and Dr. Borst can say the atomic-powered locomotive "now seems round a much closer corner than was originally believed"—it would be a great opportunity cast aside if Britain while, as it is known, harnessing atomic energy for use in such fixed equipment as power stations, were to neglect investigation of its potentialities for traction. We lack neither the technical skill nor the facilities for collaboration in research. There is, indeed, a precedent in our gas-turbine research referred to in a lecture to the Institution of Mechanical Engineers by Sir H. Roxbee Cox, Chief Scientist, Ministry of Fuel & Power, summarised in our July 25, 1952, issue, in which it was stated that the Ministry of Fuel and Power, after consultation with the then Railway Executive, had ordered in 1952 from C. A. Parsons & Co. Ltd. and the North British Locomotive Co. Ltd. a 1,800-h.p. coal-fired, gas-turbine locomotive. Sir H. Roxbee Cox referred in his lecture to the Industrial Gas Turbine Development Committee, under the chairmanship of Sir William Stanier, as the link between departments engaged in this branch of research. The time has now surely come for us to set up a similar committee to investigate the application of nuclear power to railway traction. The magnitude of the task suggests that it could best be undertaken jointly by the railways, the private manufacturing interests, and the Government working in co-operation.

Automatic Acceleration in Electric Locomotives

PROGRESS in the development of automatic control systems of all kinds has made it natural that growing interest should be taken in the possibilities of equipping electric locomotives with automatic acceleration. This characteristic feature of multiple-unit trains is still rare in locomotives, although there are examples on the Continent. The French National Railways Co-Co prototype No. 6001, described in our August 11, 1950, issue, was built with automatic camshaft notching shortly after the war, and with its 4,000-h.p. rating is probably still the most powerful locomotive with a control system of this type. Examples of smaller units with this feature are seen in Belgium. The obstacle to its wider use is the variety of weight and resistance presented by the trains an electric locomotive may be called on to haul. In an automatic scheme the average current during acceleration, and consequently the tractive effort, is fixed by the setting of the accelerating relay. Limited variation by means of tappings or shunts is possible, but not to the extent often required by the range of duties to which locomotives are liable to be allotted. Apart from this limitation, considerable complexity is involved in arranging for an automatic system to notch back. With hand notching, however, a driver can easily insert resistance to the amount required to check wheelspin.

A compromise in providing automatic acceleration is seen in the S.N.C.F. high-speed Bo-Bo locomotives Nos. 9003 and 9004 described in our September 4, 1953, issue. These control equipments are arranged to notch up automatically after the driver has purposely notched back, or a supply interruption has produced the same effect. At starting, however, notch-by-notch progression under the driver's control is used because this is the system preferred by the crews as a result of their training and experience. Special arrangements have had to be made to override the inherently automatic operation of the JH camshaft system, and also to allow it to operate for rapid restorations of power. During the trials of these locomotives it is intended to experiment with a variable resistance for adjusting the accelerating relay setting to meet various starting conditions. Familiarity with automatic notching having flexible characteristics render the system more popular with drivers.

The future of automatic acceleration in locomotives can be regarded in two ways. On the one hand it can be said

that it is likely to be extended as gaps between the weights and resistances to motion of goods and passenger trains are narrowed. Such a narrowing can be expected in countries where the long, loose-coupled goods train of four-wheel wagons has ceased to feature in the railway scene. No doubt the extra high-speed express will still be required, but it is possible to foresee important groups of trains, both passenger and goods, with reasonably similar characteristics. These circumstances would encourage the provision of automatic notching. On the other hand there will be some who feel that the replacement of personal skill by automatic controls reduces the interest of the driver's work and may be detrimental to efficiency and alertness.

December Operating Results

THE last, No. 13, of the 1953 series of *Transport Statistics* records British Railways as originating 22,420,000 tons of traffic in the four-week period from November 30 to December 27. That tonnage was an increase of 1,265,000, or 6 per cent, on 1952 and a record for any December since nationalisation. Merchanise and livestock accounted for 190,000 tons of the increase, minerals for 229,000 and coal class traffic for 841,000. The satisfactory finish to the year reflects the advance in 1953 industrial production by about 5 per cent over 1952. The higher output benefited British Railways markedly in the 12 weeks to December 27, when they carried 70,110,000 tons, about 4 per cent more than in the closing 12 weeks of any year since 1948. For the 52 weeks to December 27, the additional tonnage put on rail was 5,516,000, an increase of only 1·9 per cent, and merchandise tonnage decreased by 1,352,000, or 2·7 per cent. The total tonnage for the calendar year 1953 may be estimated at some 290,000,000 tons, at least 9,000,000 tons below the revenue traffic originated by the former railway companies in 1937.

Our periodical reviews of operating results have pointed out repeatedly that the cardinal difference between prewar and present-day railway freight working is the lengthening of the average haul for all classes of traffic by 15 miles. For the 52 weeks under review, British Railways worked 22,683,427,000 ton-miles, 426,496,000 more than in 1952, or 1·9 per cent, but over 20 per cent greater than the 1937 ton-mileage. The December figure was 1,729,117,000 ton-miles, an increase on 1952 of 106,640,000, or 6·6 per cent. Expressed in wagon miles, the extra traffic throughout last year entailed the working of 4,484,486,000, an increase of 47,193,000 wagon miles (1·1 per cent); the December wagon miles numbered 333,092,000, an increase of 20,357,000 (6·5 per cent). Between them the Western and Eastern Regions performed about 70 per cent of the additional traffic movements last year.

Railway Operating Statistics

To deal with the December volume of traffic, British Railways ran 10,565,000 freight train miles, 502,000 more than in 1952 (5 per cent) and a record for December in recent years. They worked 25,000 more train engine hours (2 per cent) and raised the average train load by 2 tons to 164. The Eastern Region reached a local peak, lifting its train load by 11 tons to 185, while quickening its train speed by nearly quarter of a mile to 8·38 m.p.h. The London Midland Region usually has the largest train load, but in December its load of 183 tons was 1½ tons less than in 1952 and progressed at the rate of 7·12 m.p.h., compared with the all-line average speed of 8·17 m.p.h. Speed in the Western Region dropped to 7·88 m.p.h., but the Scottish Region, hauling a light train load and working fewer ton-miles, maintained its 1952 figure of 9·85 m.p.h. The all-line average for "net ton-miles per train engine hour" advanced 50 points to 1,100, the Eastern Region increasing its hourly output of freight train working by 108 points to 1,292 and the North Eastern by 43 points to 1,352.

The other gauge of mobility, "wagon miles per train engine hour," rose 10 points to 212, the best result in December since nationalisation. The number of loaded wagons forwarded was 2,647,000, an increase of 122,000 (4·8 per cent). Merchandise loadings were up 49,000 (5·3 per cent). The aggregate for 52 weeks was 34,640,000, a slight increase of 11,000 wagons; merchandise loadings dropped by 334,000 (2·5 per cent), almost cancelling increases of 121,000 in mineral loadings and 224,000 in coal forwardings. Throughout 1953 the average wagon load at starting point for all traffic improved steadily until it reached the record weight of 8·93 tons in December. The average would have been higher but for light loading of merchandise in the London Midland Region. Its load of 3·79 tons compared with an all-line average of 4·11 tons, the Western's 4·22 tons, the Eastern's 4·5 tons, the North Eastern's 4·48 tons and the Scottish average of 4·21 tons. The Association of American Railroads recently stressed the importance of heavier wagon loads, in these times of expensive equipment, reminding traders that better loading meant economies to them as well as to the railways. There appears to be scope for a similar effort to use wagons to better advantage on British Railways.

Railway Passenger Traffic

In the month of November 73,217,000 passenger journeys originated on British Railways, 2,693,000 more than in November, 1952 (3·8 per cent). The chief increases were 1,508,000 in the Southern Region (5·6 per cent), 514,000 in the Eastern (4·3 per cent) and 285,000 in the Scottish Region (5·9 per cent). The decline in first class travel continued; 1,766,000 journeys were 110,000 fewer (5·8 per cent), though the corresponding receipts rose by £17,000 (1·8 per cent) because the average fare was 9·5d. higher.

In the 4-week period to December 27, London Transport railways carried 43,853,000 passengers, 2,051,000 fewer than in 1952 (4·5 per cent), though 124,000 more car miles were run (0·8 per cent).

Road Transport

British Road Services carried 2,927,000 tons in period No. 13, or 129,000 more than a year ago (4·6 per cent) and worked 3,209,000 additional vehicle miles (6·7 per cent).

"Road Passenger Transport: Provincial and Scottish" booked 175,838,000 passengers, an increase of 3,560,000 (2·1 per cent), divided almost equally between the Tilling and Scottish Groups. Car-miles totalled 38,532,000, an addition of 490,000 (1·3 per cent) incurred mainly by the Tilling Group.

London Transport moved 274,387,000 people by road, 15,124,000 more than in 1952 (5·8 per cent) and collected £485,000 more in fares (14·3 per cent). Extra car miles totalled 1,133,000, an increase of 3·8 per cent.

Inland Waterways and Docks

In the 52 weeks to December 27 Inland Waterways originated 6,885,000 tons of coal class traffic, an increase of 598,000 tons (9·5 per cent), 1,912,000 tons of liquids, a decrease of 94,000 (4·7 per cent) and 3,882,000 tons of merchandise, a decrease of 188,000 tons (4·6 per cent). The total tonnage of 12,679,000 was thus 316,000 tons above the 1952 level (2·6 per cent). Nearly half of that tonnage arose in the North Eastern Division, which also accounted for more than half of the ton-miles worked. These numbered 210,571,000, or 5,692,000 more than in 1952 (2·8 per cent).

During 1953 movements of shipping did not vary a great deal at the Commission's docks, harbours and wharves, except at the Humber ports where the tonnage of ships arriving and departing increased by about 1,500,000, or 14 per cent. Inward traffic increased by only 122,000 tons to 27,069,000 tons. Imports of oil and spirit decreased by 376,000 to 9,560,000 and landings of timber declined by 45,000 tons to 2,534,000. The amount of iron ore discharged rose by 434,000 tons to 3,883,000 tons, of which 2,622,000 were unloaded at South Wales ports. Outward cargo amounted to 41,912,000 tons, an increase of 876,000 (2·1 per cent). Coal shipments of 30,950,000 tons were 1,409,000 tons above 1952 (4·7 per cent), but exports of oil and spirit were down by 439,000 tons to 7,179,000 tons, a drop of 5·7 per cent. An increase in iron and steel shipments from 767,000 tons to 897,000 was satisfactory, but the docks could handle much larger volumes of traffic than passed over their quays last year.

XUM

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Comfortable Travel

February 6

SIR,—On January 30 I travelled, as one of their guests, in the P. & O. special train from Euston to Gourock. One expects to find British Railways putting their best foot forward on an occasion of that sort. My expectations, high expectations, were fulfilled.

The rolling stock, all first class, was really clean outside and, being of the latest design, most comfortably appointed inside. Even the engine had been cleaned. Two kitchen cars each fed over 100 guests, the meals being served in our seats. The luncheon was a distinct credit to the chefs ; none of it was pre-cooked; it was admirably served. The lavatories were spotlessly clean.

It was a bitterly cold day, so cold that, despite the driver maintaining the maximum pressure for steam heating, the carriage never got more than lukewarm. The driver was astonished when, during a stop at Crewe, I told him the heat was not getting through well, because he said he had been most careful to maintain all the time the maximum pressure of 74 lb., which only goes to show how cold it was outside. Anyhow, the initiative of the guard in distributing blankets—where he got them from I know not—for those who wanted them was as commendable as it was appreciated.

Permit me to pay tribute to all those concerned for making, in face of adverse weather, a long journey by rail so pleasant, so comfortable, and so well serviced.

Yours faithfully,

C. M. SQUAREY

Pixton, Forest Row, Sussex

Increasing Railway Efficiency

February 12

SIR,—In his wireless talk on railways last Friday, Mr. Gilbert Ponsonby, referring to the steps taken to improve the efficiency of the railways, seemed to imply that, until this moment, the railway management had just ambled along in serenity. Railwaymen among his audience know very well that this is far from the case, and I think, in fairness, he should have paid some tribute to the management of the old companies and later to their successor, whose zeal in the eternal search for economy with efficiency left little to be desired.

Many researches and job analyses were undertaken from time to time, following the trade pendulum generally, for the old managements and the Railway Executive and its Regional Managers had a sure finger on the up and downs of the trade of the country and the travelling habits of its population.

In condemning unremunerative miles of track, Mr. Ponsonby made no reference to an important item, usually known as "contributory value"; with railways, as with other activities, the business has to carry such deadweight for the sake of the whole.

The travelling public is more concerned with a 10-minute late arrival of a suburban train, the cleanliness of the coaches and locomotives and so on, than with the efficient conduct of the great mass of intricate transportation which keeps the life blood of the country flowing freely ; and even in the minor troubles which beset them they are apt to overlook that in this Welfare State and its cheerful full employment, it is most difficult to find labour willing to work, for example, with a wet mop on a stick in all weathers in the open and at all hours, when a five-day week in a factory with a comfortable canteen competes for their services.

It will surprise me and many other railwaymen if this current drive produces anything spectacular ; job analysis and productivity drives are no new thing in the railway service.

While wishing the new protagonists the best of luck, I think Mr. Ponsonby might have paid some tribute to past efforts and not left an impression that at long last something was going to be done.

Yours faithfully,

GEORGE S. HUSSEY

West Ways, West Common Way, Harpenden

Restaurant Car Service

February 15

SIR,—I was interested to read in your issue of February 12 about the training school for refreshment room staff at Marylebone. It prompts me to ask whether such a school exists for restaurant car staff, and, if not, to suggest that training courses might well be given to them also.

Although every kitchen has its off-day, I have no fault to find with the general level of meals served today in restaurant cars or with the courtesy of the staff, but the serving of drinks leaves something to be desired, even in the "crack" trains.

On January 14, I lunched in the first class restaurant car in the down "Flying Scotsman." We were duly summoned to the restaurant car and sat in our seats for 10-15 minutes before any offer was made to serve drinks, and this coincided with arrival of the soup. In the down "Cornish Riviera" on February 9, though we were not kept waiting, the offer of drinks and soup also was contemporaneous.

Many passengers like to have a short drink before a meal and I suggest that conductors might be instructed to offer them before the meal and allow time for their reasonable enjoyment. This would please many passengers and incidentally increase revenue.

Instances can also be quoted of apparent indifference to passengers' tastes. On December 17 I dined in the up "Aberdonian." On this occasion the waiter did offer drinks before the meal, but when I asked for a sherry he could only produce a sweet, dark sherry, and said he was only allowed to carry either dry or sweet sherry, but not both. The result again was loss of revenue. It is usual when serving gin-and-tonic in a first class establishment for a slice of lemon to be put in the glass, but this is not done in the "Cornish Riviera," though a slice of lemon is served with the fish.

A meal in a restaurant car can and should be a pleasant interlude. The niceties of service in the better class hotel and restaurant, which make all the difference, often seem to be missing from restaurant cars, though they could easily be provided with a little more imagination and attention to detail.

Yours faithfully,

F. C. C. STANLEY

Tellisford, Slade Oak Lane, Gerrards Cross

BRITISH ROAD SERVICES TELEPRINTER NETWORK.—The British Road Services teleprinter network, the largest private system in the country, which covers 80 per cent of the B.R.S. Groups and many depots from Bournemouth to Aberdeen, has been improved by extending the tape relay method of working to the Preston and Hull terminals; there are now 15 main centres so linked. The tape relay method enables teleprinter messages from an out-station to the nearest terminal to be re-transmitted automatically over the main teleprinter network without being re-typed by the operator. The teleprinter service is used to co-ordinate vehicle movements, quote rates, and transmit information to B.R.S. Groups and Depots; it is estimated to save the British Road Services Board of Management over £1,000 a week in communication costs.

THE SCRAP HEAP

Bearding Their Wrath

A restaurant car attendant is reported to be suing the Chicago, Milwaukee, St. Paul & Pacific Railroad Company for dismissing him because he would not comply with an order that all employees in dining cars must be clean-shaven. He is seeking reinstatement and permission to keep his moustache.

British Railway Enterprise in Italy

Robert Stephenson's survey of the Florence to Leghorn railway in 1838 is referred to in a local newspaper account in 1841, which has been sent us by a correspondent. Italian civil engineers who worked with Stephenson are said to have admitted that his skill was "more than expert." The railway was built by a company on a 100-year lease granted by the Grand Duke of Tuscany. Amongst the privileges granted to the company were exemption from all duty on locomotives, rolling stock, and other plant imported from Britain. A writer in the same paper says that the English would lead the world in railway building because of their technical skill.

This was not the first railway in Italy, which was that from Naples to Portici, five miles, opened in October, 1839.

Last Car to Howth

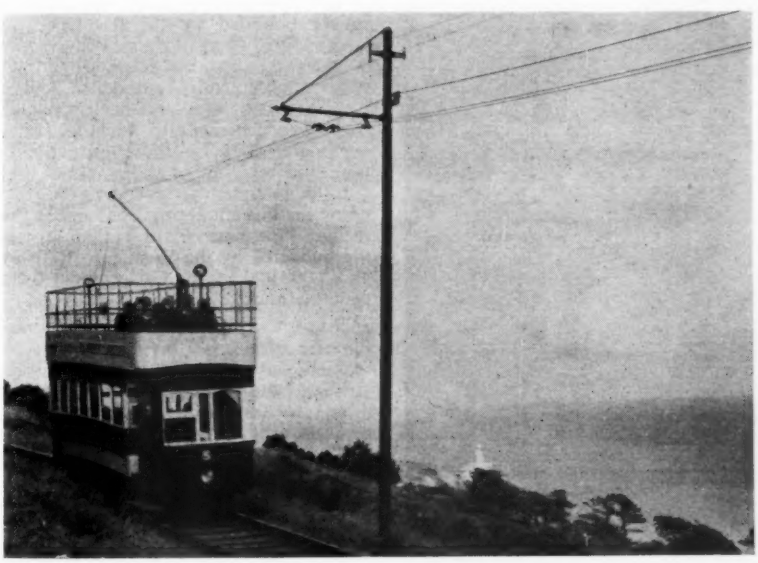
The last electric tramway in the Republic of Ireland, the Hill of Howth line, operated by the Great Northern Railway Board, will cease to operate after March 31. In recent years it has lost money heavily. The line, whose construction was made unexpectedly difficult by the rocky slopes of the hill, began on June 7, 1901, and its ten original cars have never been replaced. Cars run from Howth and Sutton stations on the G.N.R. to the summit of the hill, 350 ft. above sea level. It is intended to operate buses in substitution.

The Liverpool Overhead

A meeting of merchants and others interested in the trade of Liverpool was held for the purpose of considering the merits of the proposed undertaking [a high-level railway for the Liverpool docks] and for deciding as to the best mode of bringing the subject under the notice of the Town Council and Dock Committee. A discussion ensued, in the course of which it was stated that a comprehensive scheme for relieving the overcrowded quays, and for affording convenience and safety to those who were compelled to frequent the thoroughfares in the neighbourhood of the docks, was imperatively demanded; that Liverpool was already losing portions of its vast trade, owing to the want of accommodation for loading and discharging at the quays, and that some persons were compelled, at great loss and expense to remove departments of their trade to London.

Resolutions were passed recommending the subject to the serious attention of the Town Council and Dock Committee, and appointing a committee to adopt such measures as might be advisable to promote the views of the meeting.—*From "The Times" of January*, 14, 1854.

[The Liverpool Overhead Railway Company was not incorporated for another thirty years, until July 24, 1888, in fact, when it took over powers conferred on the Mersey Docks & Harbour Board in 1882 and 1887. The first part of the railway was opened in 1893, the first overhead railway in the world to be worked electrically.—ED., *R.G.*]



On the Hill of Howth line, near Dublin, soon to be closed

Impressive Frankness

Giving judgment against the British Transport Commission in an action for damages to goods in transit, Mr. Justice Devlin said in the Queen's Bench Division: "I have been very much impressed with the frankness with which this case has been conducted by the Commission. No doubt it is no more than one would expect from a public body, but it shows that, although in some error in this case, they are very much alive to their responsibilities, willing to take the blame, if necessary, and anxious to maintain a high standard of service."—*From "The Evening News."*

Murdered but Happy

Last week I wrote about xenialogy, the new hobby which involves collecting "choice titbits" of murdered English.

Thos. Cook & Son, who are in a strong xenialogical position, have contributed a specimen from a Polish timetable.

A railway there claims that it has "five traffic areas situated radiantly all around Warsaw." There is no such thing as unhappiness under the dictatorship of the proletariat.—*"Peterborough" in "The Daily Telegraph."*

B-r-r !

When icicles hang by the wall
And polar blasts invade the hall,
When aches and pains attack my joints,
And trains are balked by frozen points,
When harassed station-masters show
Their posters about ice and snow,
One really can't help wondering
If there will ever be a Spring.

When chilly, inspissated gloom
Descends upon the waiting room,
When bookstall boys come to admire
The lucky parcel porter's fire,
When platform staffs display no wish
To handle loads of frozen fish,
When forecasts say the same old thing
One doubts if there will be a Spring.

When bronchial woes are at their worst
And half the bally pipes have burst,
When trains arrive weighed down by snow,
Like Christmas cards of long ago,
When livers go into reverse
And travelling gets worse and worse,
You're sure at least of just one thing:
There certainly won't be a Spring.

Is there no hopeful ray of light
To penetrate this Arctic night,
No lightening of the load of doom,
Nothing to grasp at in the gloom ?
Praise be, there's here and there a straw
To clutch, whilst praying for a thaw;
"Starlights" are booking, for one thing,
And "Starlights" speak to me of Spring.

A. B.

XUM

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

VICTORIA

Branch Lines Closed

In July, 1952, passenger services were withdrawn from the Wangaratta-Bright branch. It leaves the main north-eastern line from Melbourne to Albury at Wangaratta and is 50½ miles long, running to the south-east of Wangaratta. At Everton, between Wangaratta and Bright, a fork runs to Beechworth. The Everton-Beechworth section, 10¼ miles, was closed to passenger traffic in April, 1953.

On October 12 last the Wangaratta-Whitfield line was completely closed. This was a 2 ft. 6 in. gauge branch running due south from Wangaratta and 30¼ miles long. Up to the time of its closing it was served by one train a week.

In South-East Gippsland the main line from Melbourne ends at Yarram. The last 18 miles from Yarram to Woodside were closed on May 25 last and the track dismantled. Nearer Melbourne on this route a six-mile branch from Korumburra to Outrim has been closed. On the Mornington Peninsula the main line to Stony Point runs for some 40 miles almost due south of Melbourne. From Bittern on this line a 9¼-mile branch to Red Hill was served by a weekly train for many years, but all services have been withdrawn.

Redesdale Line Reopened

From the Melbourne-Bendigo main line, a 16½-mile branch runs from Redesdale Junction, north to Redesdale. Traffic is light and the service consists of a weekly train. Last June the line was closed to all traffic, but protests which were made caused it be be subsequently re-opened.

UNITED STATES

Proposed Rail-Road Route

The New York firm of Parsons, Brinckerhoff, Hall & Macdonald has been entrusted with the survey of a combined rail and highway project for the construction of a low-level route from San Diego, California, to the Imperial Valley. A 34-mile tunnel under the Laguna Mountains is included. The cost of the project is roughly estimated at $400,000,000, and a toll would be levied for use of the route. It is pointed out that at present there are only two low-level routes through the mountain barrier into Southern California and both lead into the Los Angeles metropolitan area.

Hot Box Detection

Tests have been made with a device designed to bring automatically to a stop any train on which a hot box develops during running. A fuse with a low melting-point is installed in the axlebox; if the axlebox heats above a predetermined temperature the melting of the fuse causes the air-brakes to come into action, with a service application or an emergency application at will.

In the test a bogie wagon of which all four axleboxes had been fitted with the appliance, and had been thoroughly cleaned of lubricant, was run in a continuously-braked freight train at speeds up to 40 m.p.h. The bearings had been provided temporarily with pyrometers, and the fuse in the first box melted when the bearing temperature had reached 350 deg. F. and the axle temperature 375 deg. The other three fuses went at 370 deg., 330 deg. and 340 deg. box temperature, and 390 deg., 400 deg. and 400 deg. axle temperature respectively.

In each case the train was brought to a stand by an emergency brake application directly the fuse had melted, and the box concerned was then repacked and oiled before the test was continued. Inspection showed that each stop had been made in time to forestall any damage to an axlebox through overheating. The time which was needed to replace a detector fuse averaged less than 30 sec.

ARGENTINA

Works on D.F. Sarmiento Railway

Work will start this year on a scheme for the complete reorganisation of the Buenos Aires services of the D.F. Sarmiento Railway, including the virtual rebuilding of the 1 de Marzo (former Once) terminus. When the scheme is completed, the terminus will have four main-line platforms, capable of taking 18-coach trains, and six for suburban services, accommodating 10-coach trains. The existing low-level terminus in the Plaza Miserere underground station, which has only one arrival and one departure platform, will be closed and all suburban trains will be diverted to the new station.

New wings, housing the administrative, booking, goods and parcels offices, will be added to the existing station buildings, covering three sides of a square bounded by the streets Bartolomé Mitre, Cangallo and Pueyrredon. At the same time, the existing buildings will be completely remodelled and a large new concourse has been provided for. The scheme also includes automatic signalling on the suburban section, and relaying of the tracks.

It is intended to spend 80,000,000 pesos on this modernisation, under the second Five-Year Plan, 71,000,000 being budgeted by the Sarmiento Railway and 9,000,000 by the Government from general funds.

BRAZIL

Santos-Jundiai Railway

The Export-Import Bank $8,600,000 loan to the Santos-Jundiai Railway will be used to purchase 87 wagons and install automatic couplings and compressed air brakes throughout the system. These have already been fitted to Central Railway wagons and are about to be installed on the Paulista Railway, so that rolling stock will shortly be able

South African Narrow-Gauge Articulated Locomotive

Photo] *[F. H. Worsfold*

A Beyer-Garratt 2-6-2 × 2-6-2 locomotive on a goods train on the narrow-gauge Umzinto-Donnybrook line, South African Railways

to move freely over the three systems, without unloading. Traffic will also be handled more economically, as train loads on the Santos-Jundiai are now limited to 20 1,000-ton wagons, which is below the hauling capacity of the locomotives. As from December 21 steam has been entirely replaced by electric and diesel traction on the Santos-Jundiai Railway.

Wagon Building

A group of Sao Paulo industrialists has formed a company, with a capital of 5,000,000 cruzeiros (£100,000), and has acquired 22,000 sq. m. of land at Cidade Industrial, Belo Horizonte, for a factory to build railway wagons.

Brazilian manufacturers of railway materials are being invited to quote prices for 450 metal, metre-gauge wagons for the Parana-Santa Catarina (200), Goias (150) and Noroeste (100) railways.

FRANCE

Higher Voltage on 50-Cycle Line

Locomotives and motor coach stock on the 50-cycle electrification from Aix-les-Bains to Annecy and La Roche-sur-Foron are now operating on a 25,000 V. supply, the voltage having been raised from 20,000 in the closing months of last year. Work at the substations was carried out in two stages, during which steam traction was used temporarily on the section being converted. Operation at 25,000 kV. began on November 4, when the Oerlikon Co-Co locomotive returned from being converted at the Oullins workshops, to which three motive power units were sent at a time, while the other three remained in traffic. Electric traction was withdrawn from the whole line only for three days during the changeover operations.

DENMARK

Railway Works in 1953

Engineering achievements during the past year include the extension of the Copenhagen electrified suburban system from Valby to Glostrup. The work involved the construction of two new tracks from Valby to Hvidovre and one new track from Hvidovre to Glostrup, major reconstructions at Valby, Hvidovre and Glostrup stations, and the construction of a new station at Brondbyoster. Ten new bridges had to be built, and ten existing bridges reconstructed. The cost of the scheme has been just over £1,000,000. Other improvements to the Copenhagen electrified suburban system carried out in 1953 include the construction of two new electric substations. Preparations for future extensions of the system were continued.

Outside the Copenhagen area, much progress was made in 1953 with the earthworks and engineering works at Odense to bring the South Funen Railway into the State Railway Station. This work is scheduled for completion in time for the next summer timetable. As a first stage in a programme for the improvement of transport across the Great Belt, a new ferry berth has been completed and put into operation at Nyborg, where a beginning has also been made with a major station reconstruction scheme.

For the German ferry traffic to and from Grossenbrode, one of the berths at Gedser has been rebuilt and other works have been carried out or begun with a view in increasing the passenger handling facilities at Gedser. In Jutland, major station reconstruction works, partly in connection with the double-tracking of sections of line, have been well advanced during the year. The State Railways have also been concerned with major repair and maintenance works on some of the largest bridges. Some level crossings have been eliminated by the construction of overbridges or underbridges.

Publications Received

Titled Trains in Pictures: Hampton Court. Ian Allan Limited, Craven House. A collection of illustrations. 8½ in. × 5½ in. 34 pp. Price 2s. 6d.—The 70 photographic reproductions are reprinted from "Titled Trains of Great Britain," by Cecil J. Allen, now in its fourth edition. This album of trains in motion is well produced on stiff art paper. The photographs are clear and varied and should appeal to the railway enthusiast.

Transport and the State of Trade in Britain. By Thor Hultgren, New York: The National Bureau of Economic Research, 1819, Broadway, 9 in. × 6 in. 114 pp. Paper covers. Price $1·50.—This study, the subject of editorial comment elsewhere in this issue, applies to British transport, and particularly to an intensive analysis of the operations of British railways from 1919 to 1952, techniques the author developed for the study of American transport, on which he reported in a monograph, "American Transportation in Prosperity and Depression," published by the National Bureau in 1948. In his study of British transport, in which he was assisted by Mr. William I. Greenwald, he could test his conclusions on the reaction of the American transportation system to alternating expansions and contractions in general business activity by relation to the experience of the systems of another country. The idea that an increase in the physical volume of business makes necessary an increase in the stock of equipment used to handle that business he finds to have little support in the experience of railways, which handle traffic increases largely by using their plant more extensively. Over longer periods, he observes, the idea has more validity: the cumulative growth of traffic during the nineteenth and early twentieth centuries could not have taken place without great accessions of equipment. Between the wars, the general trend both of railway traffic and of stocks was downward. Wartime postponement of railway maintenance, additions, and replacements has led to post-war efforts to catch up on needs and has much influenced the course of investment in transport since the war.

A.B.C. Coach Guide, Advance Summer Issue.—Advance information of summer services and tours is contained in the Advance Summer Issue of the *A.B.C. Coach Guide*, now available. The guide incorporates many improvements, and one new section which contains timetables of the principal Continental coach services. In the timetables, a number of services is included for the first time and a convenient list of them appears in the editorial at the front of the guide. Additional tables of connecting services have been inserted to assist travellers to work out cross-country journeys. The new coach stops in the Kings Cross area are shown on a map. The information on principal bus services has again been expanded. The catering section has been enlarged and the feature on historic houses and castles now includes for the first time some of the gardens regularly open to the public. The guide is available from offices of coach and bus companies, or direct from Index Publishers Limited, 69, Victoria Street, London, S.W.1. The price is 3s. (postage 8d.).

Wiggin Nickel Alloys.—Wiggin Nickel Alloys, No. 24, contains an illustrated description of a unique large-scale experiment in lining a reservoir with rubber, which should be of interest to civil engineers. Other articles deal with Monel ragbolts, pipelines of uniform wall thickness, pickling chains, marine chronometers and electrical instruments. The high-speed cutting of the Nimonic alloys and the production of oxy-insulated Brightray resistance wire are also described. Copies may be obtained, free of charge, from Henry Wiggin & Co. Ltd., Thames House, Millbank, London, S.W.1.

Harry Ferguson Tractors and Equipment.—Two Ferguson tractor models have been introduced for industrial and semi-industrial uses, and details and specifications are given in an illustrated booklet published by the firm. Details are also provided of various road-making equipment which includes high lift loaders and dischargers, tipping trailers, earth movers and sweepers made by various firms for use with the Ferguson industrial tractor. Ferguson implements include tractors combined with post hole digging equipment; earth scoops, levellers, cordwood saws, all of which are operated from the tractor seat.

XUM

Sixteenth International Railway Congress

Review of Electric Traction Systems

No existing form of operation can be pre-eminently advantageous in all circumstances

QUESTION 3 for consideration by the forthcoming International Railway Congress in London asks whether technical and economic investigation shows that there are valid reasons for preferring any one of the electric traction systems now in use to the others. Data submitted by nine railways and organisations in the United Kingdom, the United States, South Africa, India, Denmark, Norway, and Sweden are examined in a report by Mr. S. B. Warder, Chief Officer (Electrical Engineering) British Transport Commission.

The introduction to the report shows the difficulty of stating categorically that any one system of electrification can be preferable to all others for all railways at this or any other time. In the next section the reasons why railways have been electrified and the possibility of justifying the cost involved are considered. It is accepted that trains should run so as best to suit the public they seek to attract, and therefore a general justification for electric working is that it must offer what is wanted more cheaply than other forms of motive power.

Some lines built in the early days of railways seem doomed to be closed. Where traffic density is a little higher, diesel railcars may stimulate traffic, and such lines might possibly be considered for electrification where oil is not a natural product and the use of motive power based on home resources is important. It is on routes of higher traffic density than the foregoing, and those where a higher density might be stimulated by providing the services the public wants, that electrification becomes of general interest. Such lines need punctual, fast, frequent, and comfortable trains. Consequently, it is stated in the report, the motive power units and rolling stock types are of fundamental importance. The other questions of power supply and fixed installations, on this view, are of secondary importance whatever they may cost, because, if they cost nothing and yet involved motive power units and rolling stock of unsuitable qualities, the lines would be useless to the railway administration.

For lines of high traffic density the system having the best motive power characteristics might well be preferred even over one having a lower initial cost because it is more likely to regain, retain, and attract net revenue earning traffic.

The following four traction systems form the basis of the study: d.c. at 1,500V. and 3,000V.; and single-phase a.c. (11-25kV.) at low frequency or one of the standard industrial frequencies. Motive power equipments of proved success are available for the first three of these systems. Although great strides are being made in a.c. commutator motor design, it is still true to say that the d.c. motor has a better traction characteristic than its a.c. counterpart, which has a relatively poor starting performance and shows to better advantage in the higher speed ranges. In this connection the report notes the desirability of a flexible transmission to prevent commutator damage if a low-frequency a.c. motor is held stationary through failure to start the train, and comments that such a transmission is essential on commercial frequencies.

Converter equipment is attractive in enabling the reliability and flexibility of the d.c. traction motor to be combined with the advantages of high contact line voltage. Modern rectifiers have opened up new possibilities in this sphere and simplify interrunning with existing d.c. systems. None the less it is probably true to say that the d.c. traction motor with a wide range of field weakening and with resistance control, operating at 750 or 1,500V., is and will remain the simplest, cheapest, and most reliable form of motive equipment.

Proceeding from technical to commercial considerations, the report discusses the importance of reliability in rolling stock, this being the component with which the railway's clients have direct association.

Scope of Motor Coach Stock

After reviewing the reasons why electric locomotives usually have been adopted for main lines, it is observed that frequency of passenger service demands a succession of fairly light trains, and if locomotive power is not to be wasted it seems more reasonable to use locomotives of moderate output arranged for multiple-unit control. Such locomotives would be much more attractive financially if they could be arranged to carry payload, which suggests that the multiple-unit train may be pre-eminently suitable for providing safe, rapid, frequent, and comfortable transport of a kind which could enable the railways to take a profitable lead once more in this sphere.

With the low centre of gravity and light leading axle loads of motor coaches, speeds of 90 m.p.h. and over can be maintained without difficulty over long distances. Among the advantages of such stock the question of auxiliary power is important. In motor coach trains supplies are directly available on each unit for lighting, heating, cooking, refrigeration, ventilation and other purposes. For locomotive-hauled trains much of this power is often furnished by axle-driven generators on the various coaches, so that it absorbs valuable tractive effort from the locomotive. The elimination of the large steam heating boiler would be generally welcomed.

It cannot be agreed that the usefulness of the motor coach train ends with passenger traffic. One of the most disconcerting features of the general loss of revenue experienced by many railways is the " skimming " process by which the lighter, more easily handled parcels and freight traffic is taken from them, leaving to the railways the awkward, heavy, and unprofitable loads. On the roads this traffic is handled by fleets of lorries, which enables it to reach its destination quickly and with considerably less damage than it often sustains during its transit on the railway. This is a field in which light, fast parcels motor coaches or multiple-unit trains in conjunction with suitable feeder services might score an unexpected success.

A suggested scheme for developing wider use of the load-carrying motor coach and multiple-unit train is as follows:—

Type of traffic	Type of service	Motive unit
ow and medium densities	Passenger and freight	Passenger and parcels carrying motor coaches and m.u. trains
High densities	Light freight ...	Total adhesion locomotives (mixed traffic)
	Heavy freight	
	Special passenger	
	Passenger ...	Multiple-unit stock

In connection with the above proposals it is again emphasised that there can be no " best " system to suit all needs and every class of traffic.

Power Supply

The report reviews power supply practice for a.c. and d.c. electrification. Dealing with power factor, it foresees serious difficulty in this respect only on 50-cycle electrifications using 50-cycle motors, since the power factor of multiphase rectifiers supplying d.c. electrification is higher than the average commercial power factor; and that of low-frequency a.c. systems and of 50-cycle systems using motor converter locomotives can be made equal or superior.

Unbalance at the supply point of 50-cycle electrifications will depend on the number of tracks to be fed and frequency of train movements in the vicinity. It can be mitigated by the use of Scott-connected transformers.

As public supply networks develop, the need for railway-owned feeders should diminish progressively. Where 11kV. or 33kV. are appropriate voltages, it usually happens that other conditions involve the use of cables instead of overhead feeder lines. In these cases it is thought that the best solution is to protect the cables suitably and bury them where the terrain permits, or else to give them continuous support and protection by installing them in concrete troughing. The use of oil-filled cables for 33kV. or 66kV. promises savings in this part of the cost of electrification.

For d.c. systems mercury arc rectifiers have become established practice. When regenerative braking is desirable, and sufficient inducement is available, South African experience shows that grid-controlled rectifiers operating as inverters can be satisfactorily used, but in certain cases the main advantages of regeneration can be obtained by installing loading resistances with electronic control at appropriate substations with normal rectifiers.

In low-frequency a.c. systems, although in theory grid-controlled rectifiers could be used, it seems likely that the practice of using rotating machine type frequency changers will continue as, instead of creating rather difficult harmonic disturbances, their motors can be compensated so as to produce leading wattless current which, as in Sweden, is a valuable saleable commodity both to compensate for bad power factors of other appliances and to increase system stability and reduce overall cable loadings. This goes a long way towards compensating for the lower efficiency of frequency changers.

In 50-cycle a.c. systems, while the same advantages could be obtained by using phase converters, so avoiding most of the drawbacks of this system of electrification from the supply and railway operation points of view, the need for securing the utmost economy in fixed installations seems likely to lead to supplies being taken through isolating 2-phase/3-phase connections so as to reduce the out-of-balance.

Overhead Lines

The following estimate is given of the probable normal cost of overhead line per single track-mile, based on January, 1953, prices:—

1,500 V. d.c.	£6,000-£9,000	According to complication of line in question
3,000 V. d.c.	£5,000-£7,500	
1-phase a.c.	£3,000-£6,000	

High-voltage a.c. systems demand much larger air clearances both to fixed structures and between contact wire, locomotives, rolling stock, and freight loads.

In suggesting the following minima under normal temperature conditions, it is added that where there is risk of steam traffic passing under the wires at least the higher of the two values should be used:—

1,500 V. d.c.	3 in. absolute	6 in. desirable
3,000 V. d.c.	5 in. absolute	8 in. desirable
16,000 V. a.c.	10 in. absolute	15 in. desirable
25,000 V. a.c.	15 in. absolute	20 in. desirable

Costs involved in the alteration of clearances are a principal reason why it is so difficult to make a general assessment of the position of the higher-voltage systems. Much economy can be achieved by close co-operation between the civil and the electrical engineer and in the limit special steps might be taken such as coasting through short obstructions.

There is also the possibility of using lower voltage on long, difficult obstructions such as tunnels, although this entails considerable expense and certain other drawbacks.

It is quite easy to spend on altering one overbridge as much as for a single track-mile of overhead construction. In one example in Great Britain the cost of structural alterations has been 15 per cent of the cost of the overhead equipment (including structures and foundations).

Cross Section of Copper

The strength needed in the overhead supporting structures depends on the cross-section of copper and here the higher-voltage systems have the advantage.

In spite of the lighter line, however (and the copper section of a 25kV. system may be only a quarter of that for 1,500V. d.c.) it is not always possible to obtain a corresponding reduction in the number of supports. When allowance has been made for the effects of icing and wind, the structure spacing may have to be about the same as for the d.c. system in order to keep sag and "blow off" within permissible limits.

Individual structures for high-voltage lines may have the advantage of lightness, but even here the light construction characteristic of the appearance of such installations is generally because where they are used there is much single track work and good clearance between tracks and at the side of tracks. Where such conditions prevail on d.c. railways, as in parts of Italy and on lines now under construction near Copenhagen, similar advantages can be obtained.

Economies may be realised from the wider range of structures possible with a reduction in load. Where timber is cheap and good, timber poles, which are rarely permissible on 1,500V. d.c. schemes, may be practicable for high-voltage a.c. schemes, as for example in Norway and Denmark. There is a stronger case similarly for tubular steel poles and probably for prestressed concrete poles on single track lines, particularly on high-voltage systems.

Multiple-track d.c. electrification seems to give reinforced concrete poles the least scope to be decisively better than the conventional types of steel mast or gantry.

Pressing as may be the need to find a type of structure which will not require regular preservative treatment, it seems doubtful if the overall advantage of prestressed concrete will in such cases be as great as was hoped for, though for simple track work there is little doubt that it will be widely used.

Capital Costs

It proved impossible to make an effective comparison of either initial or operating and maintenance costs of electrification on the basis of the replies to the questionnaire, mainly because of the different periods at which the schemes were undertaken and the varied characteristics of the railway systems concerned. The reporter has therefore given his estimates of the cost of electrifying two simple imaginary lines with different traffic characteristics, either at 1,500V. d.c. or 25kV., 50-cycle single-phase a.c.

For a short stretch of line of 90 route-miles carrying heavy traffic and worked by 72 motive power units, he computes a total cost in both cases of £8,600,000. The high-voltage scheme save on overhead line costs but involves three times the expenditure on clearances, twice that on signalling, and a third more on telecommunications modifications. Motive power units for 50 cycles are estimated to cost £3,700,000 against £3,200,000. Substation and feeder costs, however, are put at £300,000 instead of £800,000 for the d.c. scheme.

In the second example—a long, light traffic route of 360 route-miles worked by 24 motive power units—the 50-cycle scheme is estimated to involve only 55 per cent of the capital cost of the 1,500V. d.c. electrification. Clearances and signal modifications are both estimated to cost twice as much as with d.c., but the overhead line cost is halved, and substations and feeders reduced from £2,400,000 to £200,000. Motive power units are again shown as costing 15 per cent more for the 50-cycle scheme than for d.c.

It is held that there can be little doubt that on the heavy traffic line there may well be nothing to choose between the two systems when all factors are considered, but that there is a marked advantage in adopting a high-voltage system on long, lightly-loaded lines. The same comparison is expected to apply to operating costs.

Two questions sought to establish why administrations had chosen their present systems of electrification.

The British Transport Commission reply is that general electrification today would be on the 1,500V. d.c. overhead line system, the conductor rail system being retained on certain parts of the Southern Region. Use might be made of 3,000V. d.c. or single-phase a.c. at low or standard frequency for secondary lines with light traffic, provided this would not be prejudicial to operation on lines equipped with 1,500V. d.c.

If interrunning were not a factor, attention would be given to 3,000V. d.c. or a.c. 50-cycle systems, but any economy remaining after subtracting the cost of obtaining bigger clearances for the latter system would not make the change of system worth while.

XUM

Switching of D.C. Traction Feeders

D.C. high-speed circuit breaker on the magnetic holding principle

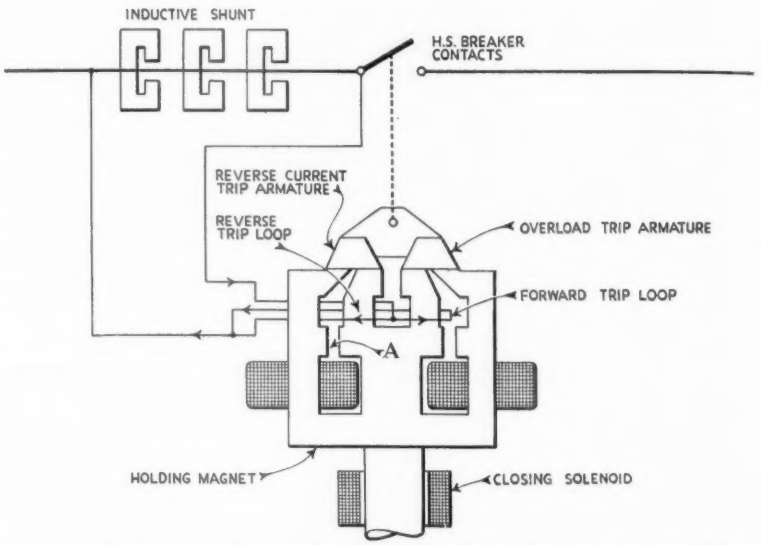
By J. C. Grant, M.Sc., A.M.I.E.E., A.M.N.Z.I.E.

THE switching and protection of d.c. traction feeders is a problem of some complexity with specialised features which are not encountered in other switching applications. It has always been recognised that the interruption of d.c. circuits is more difficult to achieve than that of a.c. circuits in which the current automatically passes through zero every half-cycle. Traction circuits have the added disadvantages of a rapidly fluctuating load, and an unfortunate similarity in characteristic between the normal operating currents and certain fault currents both in magnitude and rate of rise.

Whereas a fault on a normal supply system is a rare occurrence, faults are a regular feature of a d.c. traction system, requiring high speed interruption followed by a speedy restoration of the supply, except in the few cases in which the fault becomes permanently established. Circuit breakers in d.c. traction feeders have thus a very onerous duty to perform. Whilst they must be robust enough to withstand the frequent interruptions and reclosures inherent in the normal traction duty, their moving parts must be light and capable of high acceleration during fault interruption. Their tripping system must also be designed to give a fine degree of differentiation between normal load currents and fault currents of similar characteristics.

Benefit of High-Speed Tripping on D.C.

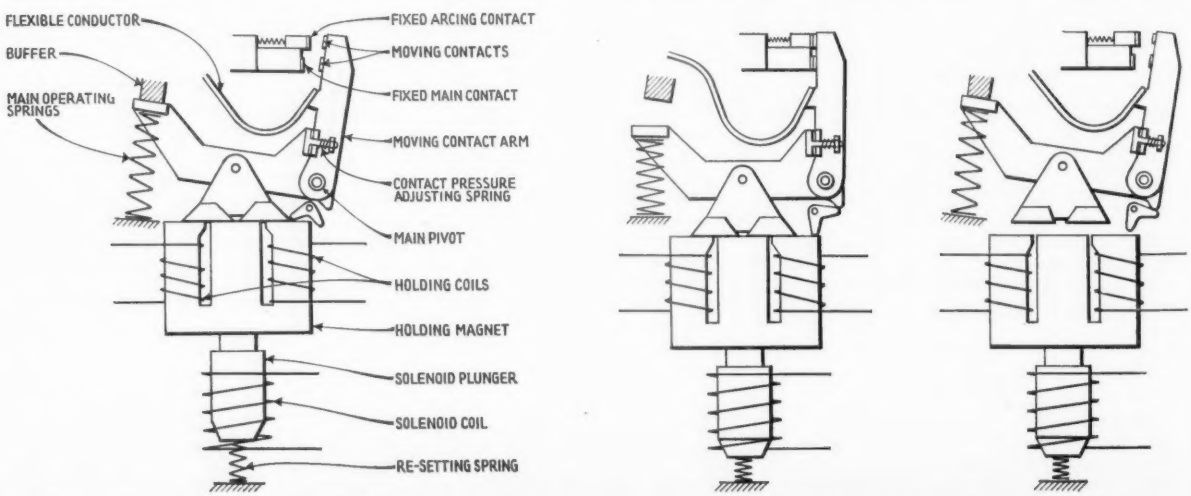
Delay in extinction of the arc until the occurrence of the subsequent current zero is a commendable feature of the a.c. interruption process. On the other hand, the greater the delay in contact separation and arc suppression in a d.c. circuit breaker, the greater the risk of serious damage to the equipment protected by the circut breaker and the more onerous the conditions for circuit interruption becomes. For these reasons, it is now considered best practice to initiate the tripping of a d.c. high speed circuit breaker from the rate of increase of current arising from a short circuit in order to prevent the current rising to its ultimate magnitude. This is most satisfactorily achieved in a breaker designed on the magnetic holding principle, in which a diversionary tripping loop is used to redistribute the flux in a normally excited holding magnet system. An inductive shunt in the main circuit ensures that the greater proportion of a rapidly increasing current passes through the tripping loop, thus releasing the holding armature and allowing the powerful opening spring to separate the breaker contacts.



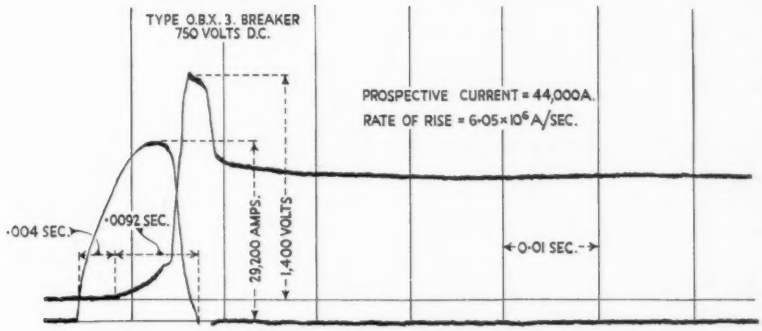
The holding magnet system of the type OBX.3 high-speed circuit breaker showing the bi-directional tripping feature

Magnetic Holding Circuit Breaker

In order to provide a practical illustration of the manner in which the de-



Left to right: Stages 1, 2, and 3 of the operating sequence of the English Electric type OBX.3 high-speed circuit breaker



Oscillogram of a typical D.C. short circuit interruption

sign problems of a high speed circuit breaker for d.c. traction service are approached, a circuit breaker which has already been well proved in service will now be described. This is the type OBX.3 high speed circuit breaker manufactured by The English Electric Co. Ltd., which is rated for traction duty up to 3,000 amps at 750 or 1,500 V. or 2,000 amps at 3,300 V., with superimposed short time overloads.

At the outset it should be realised that there are two means by which a circuit breaker of the magnetic holding type can trip, depending upon whether the trip sequence is initiated by an operator or by a fault. The magnet system, which holds the contacts closed against the compression of the opening spring, consists essentially of a d.c. electromagnet and an armature which is attached to the moving contacts through a contact pressure adjusting spring. For an operator initiated trip the current in the holding coils is broken by means of a contactor, so that the armature is released and the contacts are quickly separated by the action of the opening spring.

Trip Loop

In order that the contacts shall separate in the minimum possible time upon initiation of a fault, a turn or sometimes two turns of copper, known as the "trip loop," is wound round the holding magnet in addition to the holding coil. When this loop carries current additional magnetic flux is set up in the top half of the magnet and armature as indicated in the figure. Depending on the direction of the current in the trip loop the flux in the armature will either assist or weaken the flux in the holding coil.

Sufficient trip loop current in the predetermined direction will reduce the armature flux below the value required to hold the armature against the force due to the compressed opening spring, and the breaker contacts will consequently separate. This system of tripping is known as the flux diversion method since the trip loop current effectively diverts a proportion of the excitation flux away from the armature and through the leakage gap designed for this purpose (at A in the diagram). Diversion of the flux in this manner occurs almost instantaneously and is the principal reason for the high speed operation of this type of breaker under fault conditions.

Bi-Directional Tripping Feature

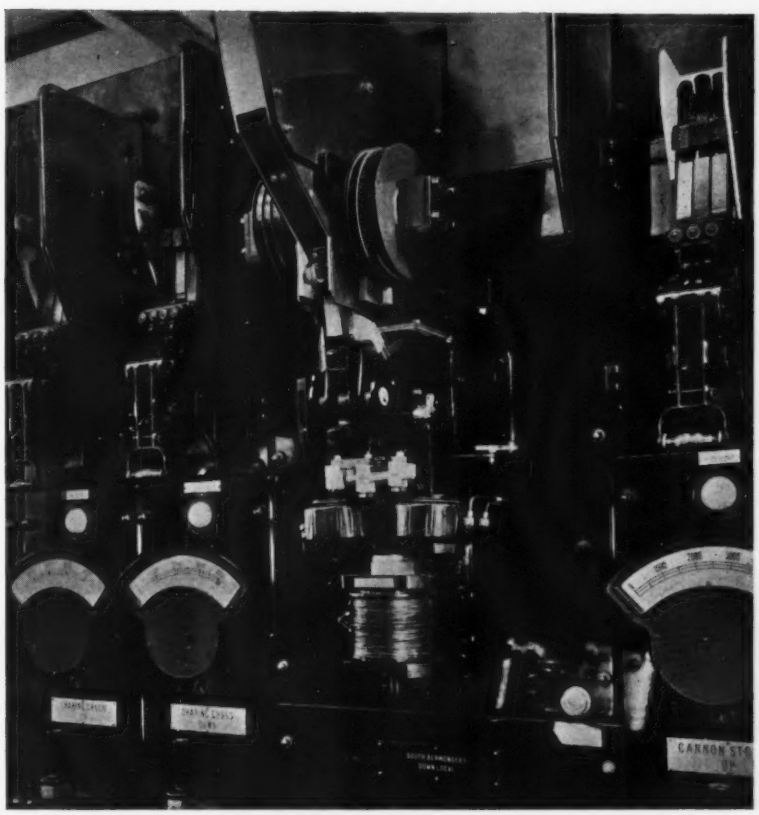
The breaker described differs from all other high-speed breakers of the magnetically held type in that it can be arranged to trip at different values of current in the forward (overload) and reverse direction of normal flow. This feature is obtained by the use of a holding magnet assembly which is in effect two magnet and armature systems each complete with its own excitation coil and trip loop. The two magnets form one solid unit, as also do the two armatures which have one common mechanical link to the contact system. The two magnets equally contribute to holding the breaker closed and the two trip loops which are electrically in parallel are so arranged that whereas one causes a trip only on overload, the other causes a trip only when a predetermined reverse current flows.

Variations in Flux

The design of the magnet system is such that the increase in flux which occurs in the reverse armature, due to a proportion of an overload current flowing through the reverse trip loop, is a minimum due to magnetic saturation effects. Thus the reduction in flux in the armature of the forward (overload) tripping system results in release of the armature assembly as a whole. Similar effects occur vice versa with reverse current faults.

As the two trip loops affect different magnets two independent ranges of trip settings can be provided simultaneously on the one circuit breaker: a high range for overload currents in the forward direction and a low range for reverse currents, thus giving the maximum protection possible.

The arrangement of the magnet system is such that it takes little more room



English Electric type OBX.3 high-speed circuit breaker in a d.c. feeder at Cannon Street substation of the British Railways, Southern Region

than the more conventional type which gives polarised tripping in only one direction.

On this range of breakers the double or bi-directional magnet is used in all cases, one trip loop being omitted where only overload or only reverse tripping is desired.

Adjustment of Trip Settings

The setting of the overload (or reverse) trip value is accomplished by means of variation of the resistance of the trip loop.

In this manner the proportions of the main steady current which pass through the trip loop and the inductive shunt circuit are varied. A calibrated bar, half the length of which is of high conductivity copper and the other of resistance material is arranged so that the amount of copper and resistance material in the loop can be varied as necessary.

By incorporating this method of adjustment the holding magnet iron path and its excitation supply need not normally be altered. The advantage here lies in the fact that optimum values of magnet flux can be used at all times; besides leading to maximum stability the value of flux can be so chosen that the trip value is not seriously affected by reasonable changes in the supply voltage to the holding magnet exciting coils.

Operating Sequence

The three stages of the operating sequence as illustrated in the adjacent diagram are as follow:—

1. Normal open position of breaker: The holding magnet and closing solenoid coils are not energised, but the holding magnet which is movable and integral with the closing solenoid plunger is held in contact with its armature under the force of the resetting spring located at the base of the plunger.

2. Normal closed position of breaker: In order to reach this position from the open position, the holding coils are first energised, producing a flux which seals the armature to the pole face of the magnet. The solenoid coil is then energised, so that the breaker closes smartly against the compression of the main operating springs. In this phase, the solenoid plunger, holding magnet and armature move downwards as a single unit. Pawls thereupon fall into position to maintain the holding magnet (but not the armature) against the compression of the opening and resetting springs, when the closing solenoid current is cut off.

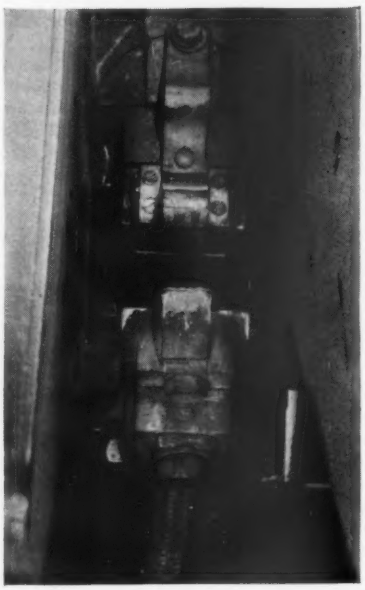
3. Position during opening of the breaker: When the holding magnet flux is interrupted, or when it is diverted by the tripping loop, the armature is released and the contacts are thereupon rapidly opened by the main operating springs.

A projection on the contact arm then disturbs the pawls, so that the resetting spring restores the solenoid plunger and holding magnet to the position shown in Stage 1.

Performance in Service

Although circuit breakers of this type are in successful service on 3,000 V. as well as 1,500 V. d.c. traction systems, details of the performance of a circuit breaker at Cannon Street Substation on the 660-V. system of the Southern Region of British Railways are given below, because of the arduous duty it is called upon to perform.

Cannon Street is one of the most heavily loaded substations on the Southern Region system, and the type OBX.3 breaker is connected in one of its most heavily loaded feeders: that supplying the down local track to Bermondsey, via London Bridge. Anyone who has stood on London Bridge



View showing condition of main and arcing contacts of circuit breaker at Cannon Street substation

Station in the evening rush hour will fully understand what this means in the matter of loading.

There are three 1,500-kW. rotary converters normally operating in parallel at Cannon Street substation during peak load periods. The maximum short circuit current for a fault just outside the substation is, therefore, conservatively estimated to be 60,000 amps, and even the minimum short circuit current for a fault at Bermondsey is of the order of 12,000 amps. The circuit breaker described here is set to trip at 7,000 amps. Peak currents of 5,000 or 6,000 amps. are a regular occurrence during the day, and the average level of load seldom falls below 2,000 amps. Despite the high continuous level of load the breaker remains quite cool during service.

The breaker was installed in March, 1948, so that it has been continuously in service for over 5½ years. During this period it has successfully interrupted 45 short circuits, many of maximum value, and in addition has operated over 100 times on overload. During the whole of this time the breaker has required no maintenance whatsoever apart from the normal regular cleaning which is given to all substation equipment.

Condition After Intensive Use

The condition of the circuit breaker contacts at the present time can be seen on the accompanying photograph. Although the contacts have never been changed during the whole of the operating period, they are still serviceable for many further interruptions. The arcing contacts certainly show signs of the number of heavy duty operations which the breaker has performed, the burning, however, is even and does not materially affect the contact faces. The main contacts are only slightly pitted, and their current carrying capacity appears, if anything, to be increased by the bedding-in process of the many operations.

Oscillogram Record

The oscillogram on page 209 was taken during a test on a similar circuit breaker to that at Cannon Street substation. The recorded peak current of 29,200 amps is appreciably less than the prospective value of 44,000 amps, and the total duration of the short circuit is only 13·2 milliseconds. The oscillogram clearly illustrates one important characteristic of all interruptions of d.c. inductive circuits, that is the overvoltage which appears across the contacts during the arcing period. In a well designed d.c. interrupter, the duration of arcing is reduced to a minimum consistent with a moderate rise of voltage above the normal open circuit value.

ELECTRIFICATION PROGRESS IN BELGIUM—Electrification between Brussels and the coast will be completed this year. Electric traction between Brussels and Ghent is due to begin in February; in July, the whole of the line Brussels-Ostend will be operated electrically, as well as the branches from Bruges to the seaside resorts of Blankenberge and Knocke. About the middle of February, ten electric express trains will be interspersed in each direction with the present steam service on the Brussels-Ghent section. When the whole line is worked by electric traction, the Brussels-Ghent section (58 km.) will be covered in 28 min.; Brussels-Ostend (121 km.) with halts at Ghent and at Bruges in 70 min. (a saving of 12 min.). In October next the Brussels-Alost and Brussels-Louvain lines will also be electrified. The complete electrification of the Brussels-Liège line is expected by the autumn of 1955. The distance of 100 km. will be covered in 60 min., a gain of 19 min.

Reconstruction of Market Place Bridge, Shifnal, Western Region

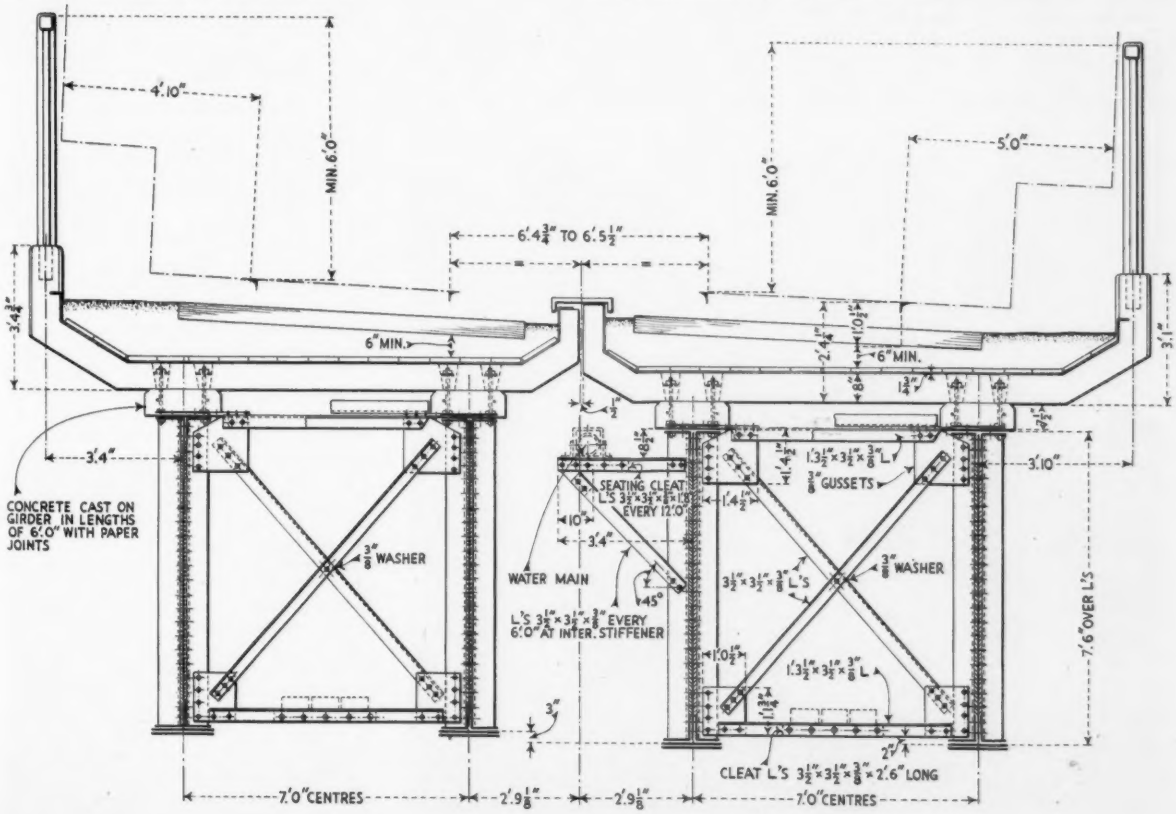
Century-old cast-iron arch replaced by deck-type steel plate-girder spans

THE bridge carrying the Paddington-Birkenhead main line of the Western Region over the old Market Place at Shifnal was reconstructed during the latter part of 1953. Built to carry the broad-gauge and opened in June, 1849, the 80-ft. cast-iron arch had a rise of 11 ft. 9 in. and gave a clear headroom of 28 ft. above the road at the centre. It was constructed by the Horseley Co. Ltd., of Tipton, Staffs. (since merged into Horseley Bridge & Thomas Pigott Limited). There were six ribs in the arch and each was cast in three pieces. The decking of cast-iron plates, ribbed and flanged and about 6 ft. square, was carried on cast-iron spandrils above the arch ribs which were braced together with cast-iron transomes. The parts were bolted together and in addition were connected by mortise and tenon joints. Gradual deterioration of the spandrils, a number of which had cracked, led to the need for reconstruction.

Independent Spans

The new superstructure consists of two independent single line, deck-type, plate-girder spans, one for each track, as shown in the accompanying cross-section. In each span there are two

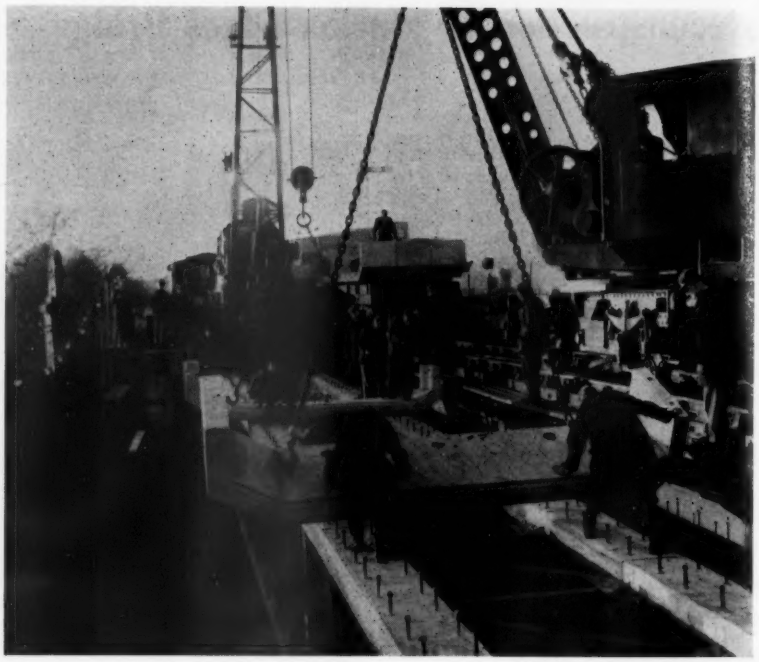
Girderwork for down line span being lifted off special wagons standing on up line; note temporary joist spans and steel trestling used to carry the tracks during demolition of old cast-iron arch



Cross-section through new spans

riveted high-tensile steel plate girders spanning 86 ft. 11 in. between centres of cast-steel knuckle bearings and 7 ft. 6 in. deep over angles. The girders are spaced at 7 ft. centres. A complete system of top lateral bracings is provided, together with nine vertical cross frames, and the whole of the steelwork for each span was riveted complete before delivery to site. Special attention has been paid to the surface preparation of the steelwork, the whole of the steel being pickled in hydrochloric acid to remove the mill scale before fabrication. The first of the permanent priming coats of red lead was applied before the steelwork left the maker's works.

The decking consists of precast reinforced concrete well-deck units, each about 3 ft. wide and weighing approximately two tons. A concrete pad some 7½ in. thick cast on the top of the flange of each girder provided a level surface on which the well-deck units rest. These pads were cast on the girders before the latter were brought to the bridge, joints being provided across the pads at intervals of 6 ft. to avoid interaction with the flanges of the girders. Bolts ⅞ in. in dia. passing through and secured to the flanges of the girders projected some 6 in. above the concrete pads. These bolts arranged to pass through tapered holes in the well-deck units act as dowels to hold the units in place; there are four bolts to each unit. Nuts and washers at the tops of these bolts key them to Ferrocrete run into the holes in the well-deck units after the latter have been landed on the concrete pads. The joints between the units are caulked with hemp rope, run in with hot-poured Pliastic covered with small precast concrete tiles set in recesses in the edges of the units; the whole decking has been protected with standard overall waterproofing and tiles.



Placing the precast concrete well-deck units on the girderwork of the down line span

Solid precast reinforced concrete parapets are provided. They consist of posts dropped into holes in the well-deck units and panels fitting into grooves on the sides of the posts. Small precast reinforced-concrete units secured to the tops of the inner sides of the deck units on the down line bridge the gap between the two independent spans; sufficient clearance is provided above the tops of the units on the up line span to avoid any contact when the down line deflects under the load. There is no bracing between the spans.

The original cast-iron arch before the reconstruction

Temporary Structure

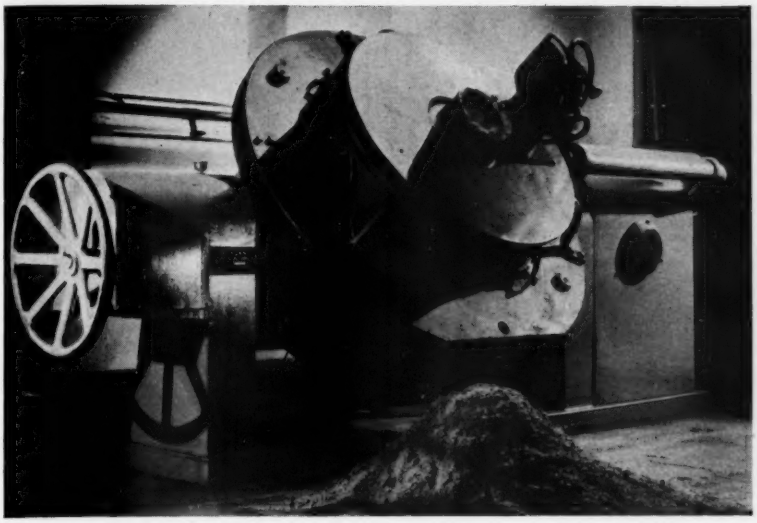
During reconstruction the tracks were carried on temporary steel joist spans supported on three bents of standard interchangeable steel trestling in the roadway. The first stage after the ballast had been removed was the removal of the cast-iron decking and the erection of the temporary steel joists on the tops of the columns, which had been sited so as to clear the arch ribs. The rails were laid on longitudinal timbers resting on transverse steel joists placed at about 3 ft. 10 in. centres and bolted to the tops of the main joists. The transverse steel joists were independent under each track.

It had been intended to lift out the spandrils after unbolting the sections from the ribs, but it was found impossible to break the joints apart. The cast ironwork in the spandrils and the ribs had therefore to be gas-cut into convenient pieces. Where practicable and when time permitted during Sunday occupations, the larger sections were lifted away by railway cranes while the rest was lowered down to the road by block and tackle and removed in lorries. The final stage involved the removal of the temporary spans and the lowering of the new steelwork on to the bearings placed on new bedstones prepared behind and clear of the arch skewbacks.

(*Continued on page* 213)

Recovery of Metal Alloys

Rotary furnace incorporating a bottle-shaped crucible for melting swarf



The Morgan rotary crucible furnace for melting swarf and metal powders

COPPER-ALLOY swarf is produced in very large quantities daily in railway workshops and the engineering industry as a whole and the reclamation of this material in usuable form with a minimum of wastage presents considerable difficulty.

The material is melted mainly to produce ingots for re-melting, and in the course of the operation metal losses tend to be high, particularly so when dealing with alloys containing an appreciable amount of zinc; metal losses are an economic factor, in view of the high price of copper alloys.

Because of the large proportion of air space in swarf and the poor contact between individual particles, heat transfers very slowly to the centre of the mass with the result that the outer layers become overheated. Overheating is most marked when flame is applied directly.

It is desirable, because of the large surface area involved, that the metal should be melted in a non-oxidising atmosphere under a blanket of flux, or by stirring into a molten bath of similar metal. It is necessary to ensure a moderate rate of heating and provision should be made for vigorous stirring of the swarf to avoid local overheating.

This is particularly so when dealing with yellow brass swarf containing 30 to 40 per cent zinc, since these alloys have an appreciable vapour pressure just above melting point. The zinc boils off very rapidly if the metal is overheated, resulting in heavy loss. It is said that losses up to 20 per cent are quite common, even for straight re-melting, through the use of indifferent technique or unsuitable plant.

As a result of considerable research into problems connected with the re-melting of non-ferrous metals the Morgan Crucible Co. Ltd. has evolved a rotary crucible furnace specially designed for the purpose. It is stated that by this method yellow brass swarf containing about 40 per cent zinc can be melted with a net loss of some five per cent, while gunmetal involves a net loss of only two per cent. Phosphor bronze and Admiralty gunmetal swarf have been melted with a loss of under one per cent. The figures give a net loss and do not include oil, water, and so on.

The furnace which is shown in the accompanying illustration, incorporates a bottle-shaped crucible in which the charge is melted in a closed atmosphere. The crucible is rotated at an angle during melting, so that the charge constantly changes over, so bringing every piece of swarf into contact with the hot surface of the crucible and giving uniform heating.

By this method the volume of swarf is quickly reduced and facilitates rapid charging through the hopper. Furthermore because of the evenly distributed temperature, additional charges readily mix with the hot charge, the whole reaching a uniform temperature just below melting point. After this stage has been reached further heating quickly reduces the swarf to a uniform melt.

Feeding down, normally required in a stationary furnace is not required. A further important point is, that the molten metal can be poured direct into the mould. The furnace is available in a standard size of 6 cwt. brass capacity and for either oil or gas firing.

The rotating part of the furnace is powered by a 5 h.p. motor, while tilting is manually operated. The equipment was designed primarily for the reclamation of copper-alloy swarf, its use has however been extended for the extraction of the metal content from other residues, zinc ash, lead, tin, and various other metallic powders.

Reconstruction of Market Place Bridge, Shifnal, Western Region

(*Concluded from page* 212)

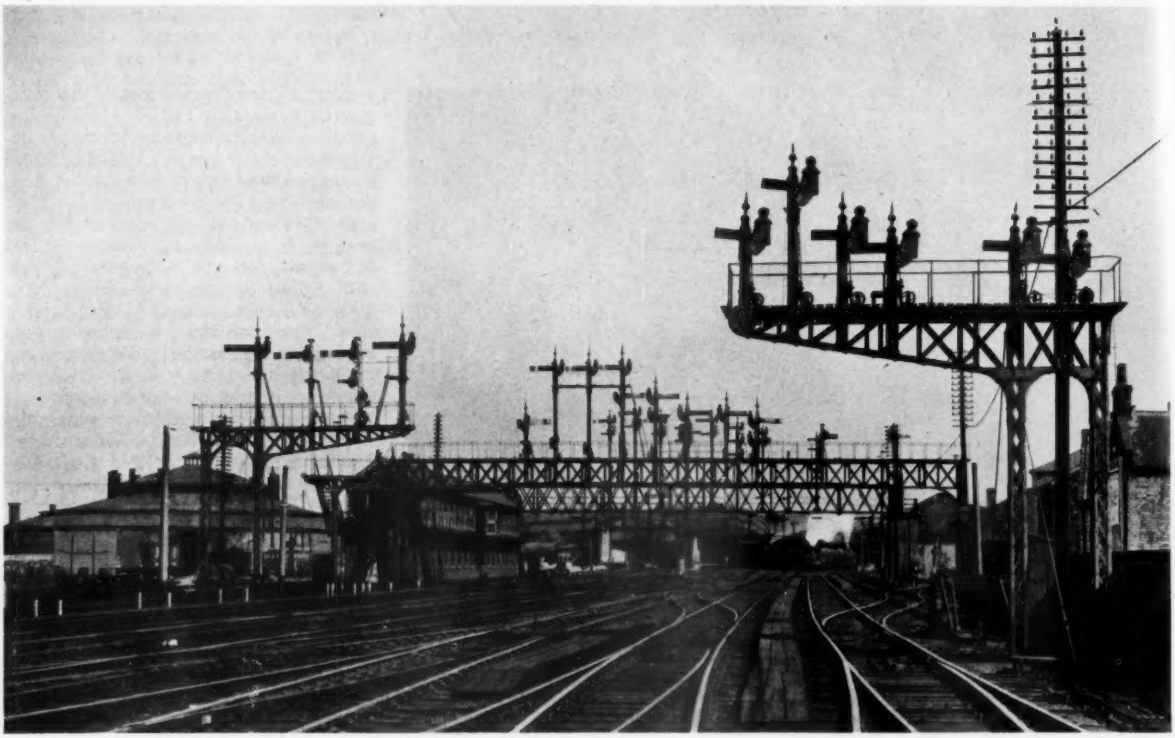
The erection of each of the new spans, including the waterproofing and laying of the ballasted track, was completed in a Sunday occupation.

The reconstruction was carried through under the direction of Mr. M. G. R. Smith, Civil Engineer, Western Region, in whose office at Paddington the design of the new bridge was prepared. The girderwork was fabricated by the Horsehay Co. Ltd., of Horsehay, Shropshire. The precast reinforced-concrete units for the decking and parapets were cast in the Western Region Concrete Depot at Taunton. The British Oxygen Co. Ltd. undertook the cutting of the cast ironwork. The demolition of the arch, the erection and removal of the temporary bridge, and the erection of the new spans, including the casting of the concrete pads on the tops of the girders, were carried out by railway labour under Mr. F. R. L. Barnwell, District Engineer, Shrewsbury.

MORE HOLIDAYS TAKEN LAST YEAR.—The British Travel & Holidays Association announces that more people went on holiday in 1953 and gave most resorts in Britain their best season, in terms of the number of visitors, since 1949. As money was "tight," few resorts could report a proportionate increase in holiday spending. British resorts faced stiff competition from London where the Coronation drew large crowds from the Provinces, and because of the increased foreign travel allowance the number who took holidays on the Continent increased by 15 per cent compared with 1952. Previous years' results have shown the stability of the home holiday trade and it is unlikely that there will be any marked fall in business during the 1954 season, but competition from the Continent, the growing popularity of touring holidays, caravanning and camping, and the tendency of more holidaymakers to stay with friends, may affect hotel business. Many resorts reported that, because of the slow start of the season, business in July and August was heavier and more concentrated than before. Some resorts thought that off-peak holiday rail tickets would help to spread holidays.

XUM

Before and After Re-Signalling at York



Southern approaches to York Station, North Eastern Region, before installation of power signalling, showing old box, the largest manually-operated frame in the world (295 levers), four gantries, and some 50 semaphore signals

After removal of signalbox and replacement of all the semaphores shown in the upper illustration by four multi-aspect colour-light signals with route indications. The re-signalling was described in our issues of September 7 and 14, 1951

RAILWAY NEWS SECTION

PERSONAL

Queen Elizabeth the Queen Mother on February 16 at Buckingham Palace, conferred the honour of Knighthood on Mr. John Elliot, Chairman of the London Transport Executive, and Mr. E. H. Lever, Chairman, Steel Co. of Wales Ltd.

Mr. P. J. Louw, B.Sc.(Eng.), M.Inst.C.E., Assistant General Manager (Technical), South African Railways, who, as recorded in our January 29 issue, has retired, completed nearly 40 years' service with the S.A.R. on February 28, 1954. Mr. Louw began his career as a pupil engineer in 1916 and worked in every province, holding successively every post in the Civil Engineering Department of the South African Railways. He was even appointed Bridge Engineer at one stage although he never occupied the post. Mr. Louw spent six years (1916-22) on the construction side; 18 years (1922-40) on the maintenance side; and three years (1940-43) as a System Manager. He was appointed Assistant Chief Civil Engineer in 1943; Chief Civil Engineer in 1950; and Assistant General Manager (Technical) in 1950, when he was elected President of the South African Institution of Civil Engineers.

Mr. A. C. Weaver, formerly Special Engineer for the Canadian National Railways in Montreal, who has been appointed Transportation Engineer for the Western Region of the company at Winnipeg, graduated from McGill University with an electrical engineering degree in 1943. During the following three years, he served with the R.C.A.F. as a signals officer. He joined the Bell Telephone Company as an equipment engineer in 1946, and two years later, began his career with the C.N.R. as Assistant Engineer of the Atlantic Region at Moncton.

Mr. Howard G. Pye, who has been appointed Assistant Solicitor, Canadian National Railways, is a native of Montreal. He graduated from Dalhousie University at Halifax with a Bachelor of Arts degree in 1949 and was made a Doctor of Law in 1951. He joined the law firm of Payzant, Coffin & Bois following graduation and was admitted to the Nova Scotia Bar in 1952.

We regret to record the death on February 9, at the age of 83, of Mr. W. A. Tookey, who practised in Westminster as a consultant for more than 40 years.

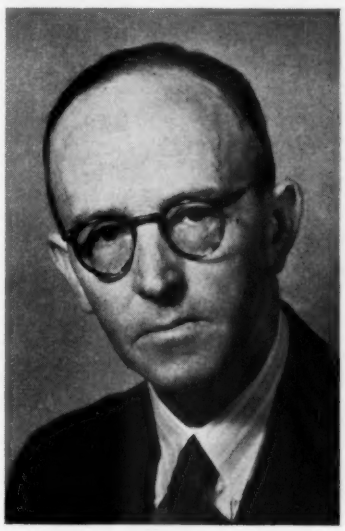
Mr. W. H. J. Moull, Assistant Chief Superintendent (Power), Nigerian Railway, who, as recorded in our February 12 issue, proceeded on leave pending retirement on December 22, 1953, entered the service of the Nigerian Railway in January, 1927. After occupying various junior grades, he became Chief Running Inspector, 1938, Assistant District Running Superintendent Grade I, 1942, and District Running Superintendent (1943). On April 1, 1951, he was appointed Assistant Chief Superintendent (Power) upon the reorganisation of the Operating & Commercial Department.

Mr. A. H. Marley, A.M.I.Mech.E., A.M.I.Loco.E., who, as recorded in our February 12 issue, has been appointed Assistant District Superintendent (Locomotive), Nigerian Railway, began his career as an apprentice with the East Indian Railway in 1929, becoming a Special Apprentice in 1930. In 1934, he was attached to the London & North Eastern Railway for special training until 1936, when he returned to the East Indian Railways as an Assistant Locomotive & Carriage & Wagon Superintendent. Between 1940 and 1944 he was seconded to the Directorate General Munitions Production, Calcutta, and, in 1945, he returned to the East Indian Railways as Superintendent Power (Locomotive). Immediately before his transfer to the Nigerian Railway, he was Mechanical Engineer, Railway Department, Trinidad.

Mr. L. D. Johnson, Stationmaster, Durham, North Eastern Region, British Railways, has been appointed Passenger Agent, Newcastle, with effect from February 15, 1954.

Mr. B. A. E. Perera, M.B.E., Divisional Transportation Superintendent, Ceylon Government Railway, who has gone on leave preparatory to retirement from the beginning of January, was born on April 10, 1894. He entered the railway service in October, 1912, and on completion of his technical training at the railway school won the bonus awarded to the best all-round student for the year. After serving at various stations as Clerk, Officer-in-Charge, Station Master and Trains Controller, he was selected for appointment as the Chief Trains Controller during the last war, when the resources of the railway were taxed to the utmost. In 1947, Mr. Perera, was appointed as an Assistant Divisional Transportation Superintendent, and served in that capacity at Colombo, Anuradhapura, and Nawalapitiya. He was promoted Divisional Transportation Superintendent in January, 1950, from which position he retires after 42 years service on reaching the age limit of 60 years.

Mr. Malcolm H. Archer, until recently Publicity Manager of the John Lewis Partnership, has been appointed Public Relations Officer to the East African Railway and Harbours. Mr. Archer was educated at Aldenham and during the last war served for three and a half years in Kenya doing welfare work in Nyanza and Central Province, and later in Nairobi as Assistant Public Relations Officer, East Africa Command. In this capacity he toured Tanganyika. Mr. Archer accompanied the 11th (E.A.) Division to Ceylon and Burma as Officer-in-Command of the 13th (E.A.) Information Platoon. Since 1946 he has been Publicity Manager for a trade association, Editor of *Philately*, Advertising & Sales Manager for an old established firm of furnishers, and more recently Publicity Manager for the John Lewis Partnership, from which post he has resigned to take up his new appointment.

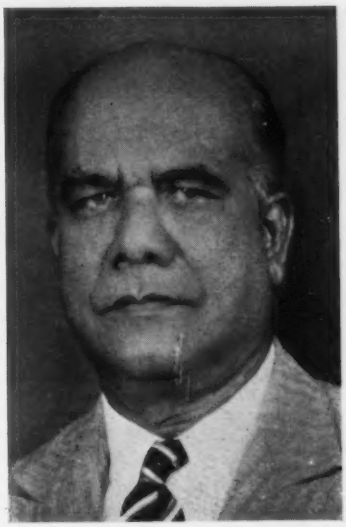


Mr. P. J. Louw

Assistant General Manager (Technical), South African Railways, 1950-54

Mr. W. H. J. Moull

Assistant Chief Superintendent (Power), Nigerian Railway, who is retiring



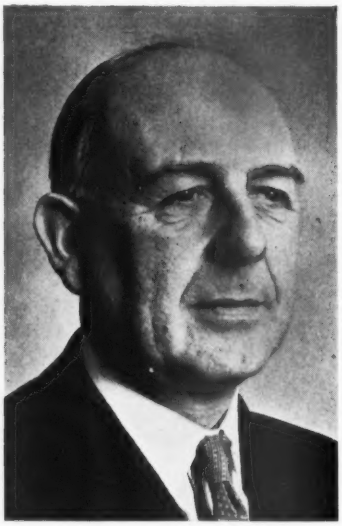
Mr. B. A. E. Perera

Divisional Transportation Superintendent, Ceylon Government Railway, 1950-54

XUM

Mr. J. Fullerton

Appointed Freight Traffic Manager, Winnipeg, C.P.R.



Mr. F. Grundy

Appointed Commercial Superintendent, N.E. Region, British Railways

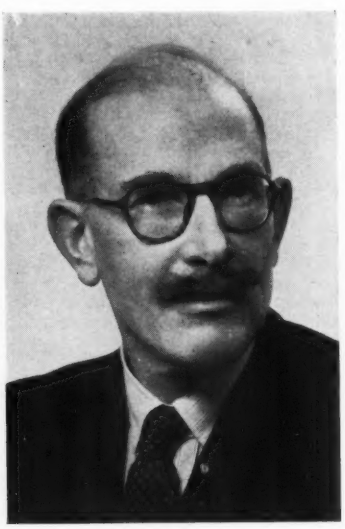
Mr. E. J. Larkin

Assistant Mechanical & Electrical Engineer, Derby, L.M. Region

Mr. John Fullerton, Freight Traffic Manager, Toronto, Canadian Pacific Railway, who, as recorded in our January 8 issue, has been appointed Freight Traffic Manager, Winnipeg, joined the C.P.R.'s Freight Department at Montreal in 1918. He later served at Toronto and Hamilton before being appointed Assistant Freight Traffic Manager at Montreal in 1948. In 1949 Mr. Fullerton took over a similar post at Winnipeg, and has been Freight Traffic Manager at Toronto since 1951. During the 1914-18 war he served with the Eighth Royal Rifles of Quebec.

Mr. Frank Grundy, M.Inst.T., Assistant Commercial Superintendent, Western Region, British Railways, who, as recorded in our February 12 issue, has been appointed Commercial Superintendent, North Eastern Region, began his railway service with the Lancashire & Yorkshire Railway at Bury in 1915. He served with the R.N.V.R. from 1917 to 1919, and, after training at stations and district offices joined the Chief Goods Manager's staff at Euston, L.M.S.R., in 1925. He worked in various headquarters sections from then until 1933, when he joined the then newly-formed Chief Commercial Manager's Research Section. In 1938 Mr. Grundy went to the L.M.S.R. staff college at Derby, and later in the same year became Goods Agent at Accrington. Thereafter he held positions as Goods Agent, Bury (1939-41); Assistant to District Goods Manager, Bolton (1941-43); Head of Merchandise Services Section, Chief Commercial Manager's Office (1943); and Goods Agent, St. Pancras & Somers Town (1943-44). He was appointed Assistant to Chief Commercial Manager (Goods) early in 1944; District Goods Manager, Wolverhampton, in May, 1945; Assistant Chief Commercial Manager (Goods) in 1946; and Executive Officer (Goods) at Railway Executive Headquarters. During the recent war Mr. Grundy's services were lent for a period to the Ministry of Food; he served as an Assistant Director Transport, and Deputy Divisional Food Officer (North West), responsible for transport and warehousing. He became Assistant Commercial Superintendent, Western Region, Paddington, on March 1, 1950.

Mr. E. J. Larkin, A.M.I.Mech.E., M.I.Loco.E., who, as recorded in our February 12 issue, has been confirmed in the position of Assistant Mechanical & Electrical Engineer, Derby, London Midland Region, British Railways, began his railway career in 1916. In this year he entered Derby locomotive works as a privileged apprentice on the former Midland



Mr. C. B. Glenesk

Appointed District Motive Power Superintendent, Glasgow (South), Scottish Region

Mr. W. C. Reynolds

Appointed District Operating Superintendent, Leeds City, N.E. Region

The late Mr. C. M. Stedman

Locomotive Running Superintendent, N.E. Region, 1931-48

Railway and gained his technical training at Derby Technical College. From April until December, 1918, he served in the Royal Air Force as a cadet pilot. On completing his apprenticeship in 1921, Mr. Larkin became a draughtsman in the locomotive drawing office and was attached to the experimental section. During the ensuing years he carried out a variety of tests on the footplate, and inspections at locomotive contractors' works. In 1930 he became Superintendent of Apprentices at Derby Works, controlling some 600 apprentices and junior technical staff, and in 1932 evolved the progressive system of workshop training, since adopted in several parts of the world. A year later he took charge of the progress office and was responsible for engine repairs at Derby and in the outstation shops of the Midland Division. Mr. Larkin became Second Assistant to the Works Superintendent in 1934 and subsequently introduced a production planning system which is still in use at Derby and has since been extended to other works. He was appointed Assistant Works Superintendent at Derby Locomotive Works in 1940 and was closely concerned with the layout of a section of the works for the repair of operational aircraft during the war. Two years later Mr. Larkin became Staff Assistant to the Chief Mechanical Engineer of the former L.M.S.R. At the end of the war he put into effect a scheme he had developed for the establishment of works training schools at each of the main works centres. From its inception in 1943, Mr. Larkin has acted as Chairman of the C.M.E. Sub-Committee. He has also been Chairman of a number of policy committees set up under the British Railways organisation for Mechanical and Electrical Engineering. He has been Assistant Mechanical & Electrical Engineer (Acting) of the London Midland Region since December, 1952.

Mr. C. B. Glenesk, A.M.I.C.E., District Engineer, Glasgow (South), Scottish Region, British Railways, who, as recorded in our January 29 issue, has been appointed District Motive Power Superintendent, Glasgow (South), was educated at Gordon's College, Aberdeen, and entered the service of the Great North of Scotland Railway as an Apprentice Civil Engineer in 1916. After war service with the Gordon Highlanders in France and Italy, he completed his apprenticeship and in 1925 took up a constructional appointment with the Gold Coast Government Railways, subsequently transferring to the Public Works Department in Nigeria. In 1936 Mr. Glenesk was appointed an assistant in the Civil Engineer's Office, L.N.E.R., Edinburgh, and in 1943 he became Senior Assistant (Construction), on the headquarters staff of the Chief Engineer, L.N.E.R., London. In 1944 he was appointed District Engineer, Guide Bridge, Manchester. He remained there until 1947, when he took up the appointment of District Engineer, Glasgow District, L.N.E.R., in 1949 being redesignated District Engineer, Glasgow (North), in the reorganisation of the Civil Engineer's Department (Scottish Region).

Mr. W. C. Reynolds, M.B.E., District Operating Superintendent (Southend District), Fenchurch Street, Eastern Region, British Railways, who, as recorded in our February 5 issue, has been appointed District Operating Superintendent, Leeds City, North Eastern Region, took up his new appointment on February 8. Mr. Reynolds joined the L.N.E.R. in 1933 and, after experience at a number of stations in the North Eastern Area, he transferred to the Divisional General Manager's Office at York. He was appointed a Traffic Apprentice in 1936, and took up the position of Assistant to the District Superintendent, Manchester, in 1939, at the conclusion of his training. He joined the Royal Engineers in 1940, and was demobilised in 1946 with the rank of Lieutenant-Colonel. He was awarded the M.B.E. in 1945, and was twice mentioned in despatches. Mr. Reynolds was appointed Assistant to the District Superintendent, Stratford, in 1946, and the following year moved to a similar position at Doncaster. He was promoted Assistant District Superintendent, Lincoln, in February, 1948; Assistant District Operating Superintendent, Nottingham, in December of the same year; and Assistant District Operating Superintendent, Doncaster, in 1949. He left Doncaster for Fenchurch Street, in September, 1952.

We regret to record the death on February 9, at the age of 68, of Mr. Charles M. Stedman, who retired from the post of Locomotive Running Superintendent, North Eastern Region, British Railways, on July 31, 1948. Mr. Stedman started his railway career at Stratford (London) in 1900. After serving an apprenticeship at the Locomotive Works he occupied a number of posts in the Locomotive Running Department of the Great Eastern Railway before being appointed Chief Assistant to the Superintendent of Operation at Liverpool Street in 1915. In 1921 he returned to Stratford as Assistant to the Chief Mechanical Engineer, and, on the amalgamation of railways in 1923, he became Assistant Locomotive Running Superintendent of the Southern Area of the L.N.E.R. He moved to the North Eastern Area, York, in a similar capacity in 1926, where he remained for the remainder of his railway career. Mr. Stedman was appointed Locomotive Running Superintendent, North Eastern Area, in 1931, a position he filled with distinction for 17 years. He was a member of the Institute of Mechanical Engineers, a Member of the Institute of Locomotive Engineers, President in 1927 of the Association of Railway Companies Running Superintendents, a Foundation Member of the Institute of Transport, and Chairman of the North Eastern Railway Cottage Homes & Benefit Fund. For many years he was a Justice of the Peace for the North Riding of Yorkshire.

The late C. M. Stedman—An Appreciation

Mr. F. H. Petty, Motive Power Superintendent, North Eastern Region, British Railways, York, writes:—

Charles Stedman was a locomotive engineer of the highest order and a grand sportsman. He loved his job, and in relaxing from it he loved his sport. In his early days his ability as a cricketer was well known in his native Essex, but early in life he had to choose between cricket and his railway career. After giving up cricket he took up golf seriously, developing into a very sound player. For many years he was a member and captain of York Golf Club, Strensall. His tall, long-striding figure will be missed by many.

A luncheon was held at the Royal Thames Yacht Club, on February 15, in honour of Mr. Robert J. Bayer, Editor, *Traffic World* (Chicago and Washington), who is visiting this country.

Among those present were:—

Messrs. C. K. Bird, Chief Regional Manager, Eastern Region, British Railways; B. W. C. Cooke, Editor, *The Railway Gazette* and Editorial Director of the Tothill Press, Limited; K. W. C. Grand, Chief Regional Manager, Western Region, British Railways; F. D. M. Harding, General Manager, Pullman Car Co. Ltd.; C. P. Hopkins, Chief Regional Manager, Southern Region, British Railways; Ben Russell, Director & Joint Deputy General Manager, Cunard Steam Ship Co. Ltd.; C. E. R. Sherrington, Director of Research Information Division, British Transport Commission; Sir Richard Snedden, General Manager, Shipping Federation; Messrs. Jas. B. Thom, European Manager, Canadian National Railways; J. W. Watkins, Chief Regional Manager, London Midland Region, British Railways; Tarleton Winchester, Assistant European General Manager, U.S. Lines.

Mr. H. T. Horsfield, Assistant District Engineer, Bradford, North Eastern Region, British Railways, has been appointed Assistant District Engineer, Leeds, with effect from February 1, 1954.

We regret to record the death on February 7, at the age of 55, of Mr. George Jendrassik, M.I.Mech.E., a Director of Metropolitan Railcars Limited since 1948, and a Consulting Engineer to Power Jets (Research and Development) Limited.

We regret to record the death on February 1, at the age of 63, of Mr. J. C. Arkless, F.C.I.S., a Director and Secretary of A. Reyrolle & Co., Ltd. Mr. Arkless had entered the company in 1904.

We regret to record the death on January 29, at the age of 61, of Mr. N. H. Miller, A.M.I.E.E., Assistant Liaison Officer of British Insulated Callender's Cables Limited. Mr. Miller joined the company in 1920.

We regret to record the death, at the age of 68, of Mr. John W. Wilson, F.R.I.B.A., Architectural Consultant to the Dunlop Rubber Co. Ltd.

We regret to record the death, at the age of 61, of Mr. C. Tooze, General Salesman at the Plymouth depot, Dunlop Rubber Co. Ltd.

We regret to record the death, at the age of 81, of Mr. Victor Hope Boalth who served on the Indian State Railways from 1896 to 1927. Mr. Boalth was Traffic Manager from 1921 to 1924, and Commercial Manager from 1924 to 1927.

International Labour Organisation

The United Kingdom Delegation to the Fifth Session of the Inland Transport Committee of the International Labour Organisation taking place during the period February 15-27 at Geneva is made up as follows:—

Government Delegates:

Mr. G. W. J. Cole, Assistant Secretary, Ministry of Labour & National Service.

Mr. A. W. Clarke, Principal, Ministry of Transport & Civil Aviation.

Employers' Delegates:

Mr. F. Gilbert, O.B.E., Principal Staff Officer, British Transport Commission.

Mr. D. F. Macdonald, General Manager, National Association of Port Employers.

Adviser:

Mr. G. Shrosbree, M.B.E., Executive Secretary, Civil Air Transport Employers' Secretariat.

Workers' Delegates:

Mr. J. Campbell, Member of T.U.C., General Council, General Secretary, National Union of Railwaymen.

Mr. F. Coyle, National Secretary, Passenger Transport Section of Transport & General Workers' Union.

XUM

Sir Brian Robertson's Visit to South Wales

The Chairman of the British Transport Commission, Sir Brian Robertson, accompanied by Mr. F. A. Pope, Member, British Transport Commission, and by Mr. K. W. C. Grand, Chief Regional Manager, Western Region, British Railways, made his first official visit to South Wales on February 4 and 5.

Arriving at Margam Station on the morning of February 4, he visited the Abbey Works of the Steel Company of Wales Limited, being received by Mr. E. Julian Pode, Managing Director. In the afternoon, he inspected the company's cold reduction plant at Trostre, where he was received by Captain H. Leighton Davies, Assistant Managing Director.

At a dinner given by the Western Region at the Angel Hotel, Cardiff, that evening, at which Mr. Grand presided, Sir Brian Robertson was introduced to many leading South Wales industrialists (see our issue of February 12).

Newport and Cardiff Docks

On February 5 he visited the ports of Cardiff and Newport. Under the guidance of Mr. A. E. H. Brown, Chief Docks Manager, the party, which included Sir Reginald Hill, Chairman of the Docks & Inland Waterways Board of Management, met technical officers of the Group and local officers during a tour of Newport Docks, ending with a visit to the new yard of the Atlantic Shipbuilding Co. Ltd., where Sir Ralph Cochrane, Managing Director, outlined the various phases through which the establishment of this new shipbuilding industry was expected to progress.

The party then went to Cardiff, where Sir Brian Robertson was introduced to local officers and inspected the cold store at Queen Alexandra Dock and other installations, besides the general cargo quays and transit sheds.

At luncheon Sir Brian Robertson met the South Wales District Officers of British Railways, Docks & Inland Waterways, and British Road Services, also trade union representatives.

Later, accompanied by Mr. C. Barrington, Member of the Board of Management, and Mr. J. Freeguard, Western Divisional Manager, British Road Services, he inspected the Cardiff Depot at Ferry Road, Grangetown, the largest completely self-contained road transport depot in the country. He was conducted round by Mr. H. S. Reed, District Manager, and, during his inspection, met the heads of departments besides meeting and talking with members of the staff of various departments and grades.

Conversion of "Arnhem" as Two-Class Ship

Alterations to s.s. *Arnhem* under the Eastern Region New Works programme recently authorised by the British Transport Commission, are the result of one class ships not having proved popular on the Harwich-Hook night service; they are the subject of editorial comment elsewhere in this issue.

The alterations will consist, on the promenade deck, of converting the existing lounge, first class bar, pantry, and other accommodation, into first and second class lounges and dining saloons. One bar will serve both the first and second class lounges but an entrance hall will be provided on the port side for second class passengers, modifications will be made to the men's lavatory, the pantry will be enlarged, and the promenade incorporated in the public rooms.

Increasing Berth Accommodation

On "A" deck, some single-berth cabins will be converted to two- or three-berth cabins and accommodation provided for second class stewards. Alterations will also be made to the lavatories. On "B" deck single-berth will be converted to two-berth cabins. The sleeping berth accommodation will be increased from 518 to 584.

Whilst alterations are being made to the accommodation, work will also be put in hand on the rebuilding of the boiler casings, which must be undertaken under normal maintenance. By undertaking both jobs at the same time, the necessity to keep the ship out of service for an unnecessarily long period will be avoided.

Tests of Compressed Air Equipment

Demonstrations of various compressed air equipment were held recently at the East Acton works of Holman Bros. Ltd. The works functions as a spares and servicing depot for the home and Southern counties, the supplies being obtained from the firm's Camborne works. The equipment demonstrated included the Silver "3" new rock drill, with and without the Dryductor dust collector equipment, the Holman Tractair, in which the compressed air equipment is powered from the rear axle of a Fordson Major tractor and the Holpack unit fitted to a Ferguson tractor.

The equipment included single- and two-stage air-compressors. The Holpack unit can be elevated, and secured in that position to enable the tractor to move to another site.

Two different types of Holpack compressors are available, the A.T.H.8 and T.A.13, with a displacement at maximum speed of 84 and 130 cu. ft. respectively.

Pacera-Maxam Power Feed

The Pacera-Maxam air-hydraulic automatic power feed unit was demonstrated. The equipment converts a drilling machine from manual to power operation in which all cycles were performed by foot-pedal, which includes drill-feed, reverse, and automatic ejection of the workpiece from the drilling jig. The principle can be applied to numerous operations involving movement or thrust, feeding, clamping, and so on.

Saving in production varies depending on the application. Where a manual machine is converted to Pacera-Maxam operation the increase in production is stated to be rarely less than 30 per cent and can be as high as 300 per cent.

The Pacera-Maxam units are made in collaboration with the Climax Rock Drill & Engineering Works Limited, and sole manufacturers and distributors are W. J. Meddings Limited, 16, Berkeley Street, London, W.1. An instructional film was also shown which demonstrated the use of the Holman Tractair equipment for dock repairs; the film is available on loan on application to the firm.

(Left) Sir Brian Robertson and Mr. K. W. C. Grand arriving at Margam Station; (centre) at the Abbey Works, Margam, with Mr. W. F. Cartwright, General Manager (on left), and Mr. E. Julian Pode; (right) Captain B. A. Luen, Dock Master, Newport Docks, receiving Sir Brian Robertson and Mr. F. A. Pope

Radio Navigation Aid for British Railways Ships

Use of Decca Navigator to be extended

After successful experience in 27 ships for some years, and with the completion of the chains of land-based transmitting stations around Great Britain, British Railways have decided, as briefly reported in our February 12 issue, to extend the use of the electronic position-fixing device, the Decca Navigator, by fitting it in the remaining 40 cross-Channel vessels of their fleet. This apparatus gives the navigating officer a simple, reliable method of fixing the position of his ship in all conditions, including fog.

The Decca Navigator enables the ship's position to be continuously known to an accuracy of a few yards by plotting on a gridded chart the readings of meters which operate automatically from the land transmissions.

The master of the British Railways vessel "Normannia" plotting the ship's position with the aid of the Decca Navigator

First Use in Railway Ships

Railway-owned vessels have been associated with the Decca system since it was introduced to the shipping world. Two L.N.E.R. vessels, the *Accrington* and *Dewsbury*, took part in the original Ministry of Transport trials in 1946. After the system was officially approved as a navigational aid early in 1947, railway vessels were rapidly fitted in areas where good coverage was initially provided. As more chains of transmitting stations were laid down, the number of ships fitted increased, the system proving itself from the beginning reliable and accurate.

The system was first used during the war to guide the invasion forces across the Channel on "D" day. It had been invented by Decca scientists and accepted by the Admiralty early in the war. After the war, the Decca Navigator Co. Ltd. was formed as a subsidiary of the Decca Record Co. Ltd., to develop the system commercially.

The basis of the system is the chains of ground transmitting stations. The Decca chains now established in Europe each comprise four stations (a central "master" and three outlying "slaves"). The stations send out continuous radio transmissions which interact to form a stationary radio pattern, akin to the stationary wave pattern formed on a water surface by the intermingling rings from two objects dropped in side by side. The lines forming this pattern remain permanently in known positions and can thus serve as navigational position-lines. They are depicted on standard marine charts as intersecting lattices, each line being numbered.

The Decca receiver carried in ships has clock-like dials which indicate continuously the numbers of the radio position-lines intersecting at the ship, so that to find the ship's position is simply a matter of reading off two numbers from the instrument and finding the point on the chart where the indicated lines cut.

Coverage of Systems

Chains of stations are in operation in the United Kingdom, Denmark, Germany, and France. The transmitters in Great Britain and Denmark are owned and operated by Decca. Those in Germany and France were ordered by their respective Governments and manufactured in those countries under licence. The chains give coverage from the Bay of Biscay to the Baltic and over most of Western Europe, so that in this large area continuous and highly accurate information on position is always available to ships and aircraft carrying the Decca Navigator, which is hired to users. It is expected that chains in Spain and Italy will soon be constructed, and projects for other parts of the world are also being actively discussed.

Parliamentary Notes

Railway Freight Charges

Mr. Alan Lennox-Boyd (Minister of Transport & Civil Aviation) replying to a question on February 10, said that as to the request by the B.T.C. for authority to raise railway freight, dock and canal charges by 10 per cent, he had decided to accept the advice of the Permanent Members of the Transport Tribunal, acting as a consultative committee, and to authorise the increase by 10 per cent as from March 1, subject in the case of merchandise by freight train and perishable traffic by passenger train to a maximum of 10s. a ton.

He had, he went on, considered the representations made to him by the Association of British Chambers of Commerce; but the issues raised by the Association could not be dealt with as part of a purely interim settlement of the Commission's pressing need for further revenue. He had also considered sympathetically the representations made by Scottish interests. Some relief would be afforded by the 10s. a ton limitation.

B.R.S. Profits

When Mr. James Callaghan (Cardiff S.E.—Lab.) suggested that if road haulage were not being denationalised, it would not have been necessary, because of British Road Services profits, to increase railway rates by 10 per cent, Mr. Lennox-Boyd drew attention to the sums from sale of vehicles, to the transport levy, and to the still substantial road haulage interests of the B.T.C.

Taking 100 as the prewar figure, the Minister added, railway freights after this increase would represent 253 compared with the figure of 323 for the *General Index of Wholesale Prices.*

Memorandum by Members of Tribunal

Later, Mr. Lennox-Boyd circulated the memorandum containing the advice of the Permanent Members of the Transport Tribunal, Sir Hubert Hull, Mr. A. E. Sewell, and Mr. J. C. Poole.

The three Permanent Members, acting as a consultative committee, examined the Commission's estimates and forecasts of revenue and expenditure, and, as a result, state in the memorandum that as matters now stand British Railways will in the "future year" be failing to pay their way by about £23,000,000.

Forecast Optimistic

In a statement supporting their application for the increase, the B.T.C. had informed the consultative committee that their total prospective deficiency was about £25,000,000, of which about £23,000,000 would be attributable to British Railways treated as a separate activity; but the Commission added that even this forecast was optimistic and took no account of factors

which might adversely affect it during the next twelve months.

"As soon as the position is clearer," the B.T.C. statement continued, "and at latest in a few months' time, this provisional estimate will need amendment, and the forecast as it then appears may well lead to a further application for increased charges. That is, the present application is designed merely to stop the greatest part of the gap which already exists and which is running as the forecast shows, at almost £500,000 a week."

The consultative committee stated that on a rough prospective profit and loss account, it was estimated that at the present level of charges British Railways would be able to contribute about £16,500,000 to the common pool of the Commission. The question was how much more the railways should contribute to pay their way as a separate activity. As the fixed assets and goodwill of British Railways represented a little more than 72 per cent of the whole of the fixed assets and goodwill of the Commission, and the apportionable central charges for the "future year" were £55,500,000, the contribution to be expected of British Railways would be rather over £40,000,000.

The Commission forecast assessed the expected contribution at £39,500,000. The committee did not think this figure excessive.

Passenger Revenue

On the question of additional revenue from passenger traffic, the committee quote the Commission as stating: "A contribution from passengers will be required in the form of a reduction in services provided to the public, where these are poorly patronised.

"It may also be commercially practicable to make selective increases in local fares, or to improve the net results of secondary lines by changing the form of operation and of motive power. But such measures cannot be expected, at least on the short term, to do more than balance the reductions which will doubtless be required in long-distance main-line fares to meet the competition from express coaches. Any general increase in long distance railway fares would, in present circumstances, do serious damage to precisely those traffics which railways find profitable."

The committee comments that no general increase could be justified and that any additional revenue from selective increases in particular fare categories would not make any appreciable contribution to the immediate necessities of British Railways.

The memorandum states that the increases now to come into effect are estimated to yield another £23,000,000 from the railways. It adds that this estimate is speculative, for "a decline of 1 per cent in the total gross receipts would result in a decrease of over £4,250,000."

There are at least two reasons why it would be unwise to act upon the view that the Commission has underestimated the yield from the increases, the memorandum states. The first is that in estimating the net revenue to be expected from the charges as they stand at present the B.T.C. has deliberately neglected many factors which may well prove its forecast over-optimistic. The second is that any increase sanctioned can only operate for at the most eleven months of the present year, and it is obviously most desirable that British Railways' accounts should be brought into balance by the end of the year.

Nationalised Industries

The House of Commons on February 8 considered the report from the Select Committee on Nationalised Industries.

Captain H. F. C. Crookshank (Lord Privy Seal and Leader of the House) who opened the discussion, said he would put forward the tentative views of the Government on the report of the inquiry into the accountability of nationalised industries. The report, he said, recommended the appointment of a Select Committee to oversee the work of those industries. That would be a great Parliamentary and constitutional change, but it would not in itself be a breach of constitutional propriety. The Government agreed that there should be some direct contract between the boards and Parliament with the proviso that the position and duties of responsible Ministers should be safeguarded. In principle the Government accepted the idea of a Select Committee subject to consideration of the views expressed in the House during the debate.

The Government did not agree with a proposal that it should inquire into future plans and programmes. There should be no question of going into problems of negotiating machinery on wages and conditions of service. The members of the committee should number from 10 to 14. It would be wiser not to publish all the evidence the committee received; the House should be satisfied with periodical reports.

Mr. Herbert Morrison (Deputy Leader of the Opposition) said he preferred Governmental and public corporation responsibility to Parliament as a whole rather than to a limited number of Members. The Government should appoint the B.B.C. type of inquiry, starting with electricity, with a mixed body of M.Ps. and capable people from outside. Except for special reasons that should not be done more than once in seven years.

Ministers and Public Utility Boards

Mr. Ernest Davies (Enfield E.—Lab.), who was a member of the Committee, pointed out that Ministers had the right to issue directives to the boards on general matters concerning the national interest. But in preference to using those directives, they had had close relations with the chairmen of the boards and influenced

R.E., A.E.R. Officers' Dinner

At the Criterion Restaurant on January 29, showing (at the top table, ninth from right) General Sir Ouvry Roberts, Quartermaster General, who presided. (*See our issue of February 5*)

them in their policies. A Select Committee would learn what policies were being carried out and Ministers would not be able to evade their responsibility.

About 20 members of all parties took part in the debate. There is to be a further debate when the Government decides on the exact proposals to which it will ask the House to agree.

Security of Mails

The Earl of Lucan, in the House of Lords on February 11, gave details of mail robberies in trains, and stressed that the thieves must have "inside" information. The Post Office, he said, had its own investigation branch; but when mails were carried by the railways, responsibility for guarding them rested with the railway police, which complicated the issue of jurisdiction. He hoped the Government could say it had set up some co-ordinating body or some system of co-ordinating the activities of all the different organisations.

Earl Winterton complained of the way in which mailbags and passengers' baggage were untended in stations.

The Postmaster General (Earl De La Warr) emphasised that losses of mail were not increasing. Recent losses on the railways, about which they were fairly sure, amounted to 29; there were 30 incidents in 1947, 13 in 1950 and 9 in 1953. It was hard to divide the incidents up as between the railways and P.O. vans because of the number of undiscovered crimes.

He assured Lord Lucan of close collaboration between the police and the B.T.C. Police where the loss concerned the railway and the P.O. investigation branch. They had worked particularly closely with the railways on improving precautions at stations. There had been a good increase in the provision of locked cages in corridor trains on main lines. As a result of the activities of a standing committee all arrangements at railway stations had been reviewed.

Staff & Labour Matters

Railway Wages Structure

Representatives of the British Transport Commission and of the three railway trade unions met on February 12 to examine the wage and salary structures in respect of British Railways salaried and conciliation staff. This was in accordance with the agreement reached with the trade unions last December. Further meetings are to take place.

Railway Workshop Staff

At a meeting of the Railway Shopmen's National Council, on February 15, the representatives of the N.U.R. and C.S.E.U. on the employees' side of the Council raised the question of higher pay for railway shopmen. Their claim for a 15 per cent increase was declined by the employers' representatives on the R.S.N.C. on September 15, 1953. Since then railway salaried and conciliation staff have been granted a 6 per cent increase in pay. So far as outside engineering workers are concerned the findings of the court of inquiry set up to investigate the dispute in the industry is awaited. No announcement was made after the meeting on February 15, but it is understood that the matter was deferred for consideration by the employers' representatives.

Supervisors employed in railway workshops are to receive comparable increase to those accorded to other railway supervisors and salaried staff, i.e., 6 per cent.

Contracts & Tenders

The British Transport Commission has placed the following contracts:—

Metropolitan-Cammell Carriage & Wagon Co. Ltd.: 120 19-ton hopper ballast wagons

Derbyshire Carriage & Wagon Co. Ltd.: 21 25-ton low machine wagons equipped for international working (R.I.V. standard)

W. G. Bagnall, Limited, has received an order from the Tasman Pulp & Paper Company, of New Zealand, for one 0-6-0 type diesel-mechanical shunting locomotive. Powered by a National M4AA6 diesel engine developing 240 b.h.p. at 1,500 r.p.m., the locomotive is the first of the new range of shunters designed by Bagnall to be ordered from overseas. The transmission incorporates the Self-Changing Gear Company's five-speed gearbox with final drive and reversing unit, and a Vulcan-Sinclair fluid coupling.

British Railways, Eastern Region, have placed the undermentioned contracts :—

Pitchers Limited, London, N.7: establishment of central store and repairs and alterations to existing buildings at Peterborough

Tersons Limited, London, N.3: renewal of permanent way in Kings Cross District

British Railways, North Eastern Region, have placed the following contracts:—

Albert Innes Limited, Leeds 1: centralised switching control, Leeds, Neville Hill and Waterloo Sidings

Cowans, Sheldon & Co. Ltd., Carlisle: three 70-ft. turntables at Thornaby New Motive Power Depot

Anglian Building Products Limited, Norwich: manufacture of precast, prestressed concrete beams

Wellerman Bros. Ltd., Sheffield 3: Lightcliffe Viaduct, Milner Royd Junction to Bradford

British Railways, London Midland Region, have placed the following contracts :

James Carmichael (Contractors) Limited, London, S.W.18: goods offices and staff amenities at Hendon Goods Yard

Leonard Fairclough Limited, London, S.W.1: renewal of drainage and ballast at Church Lawford water troughs on the Rugby-Birmingham line

Mellowes & Co. Ltd., Sheffield, 3: patent glazing and pitched roof lights for the reconstruction of Derby Midland Station roof

Wm. Sandfield Limited, Osterley; asbestos cement coverings for the renewal of engine shed roof, new pavings and alterations to pits at Walsall Motive Power Depot

W. H. Streeter Limited, Hampton, Middlesex: remodelling of the station buildings at Willesden Junction

The United Kingdom Trade Commissioner at Karachi has notified the Board of Trade, Export Services Branch, that the call for tenders issued by the Railway Division, Ministry of Communications, Government of Pakistan, for diesel railcars and trailers (see our December 4 and 11, 1953, and January 29 issues) has been postponed to March 20.

The Special Register Information Service, Board of Trade, Export Services Branch, states that the United Kingdom Trade Commissioner at New Delhi has reported that the Director-General of Supplies & Disposals, Government of India, is calling for tenders for:—

32 springs bearing, tank engine, new type, 12 plated without slotted end

84 springs bearing, hind truck, for "YP" and "YG" locomotives (silico manganese steel grade 2)

60 springs bearing, bogie tender, for "YP" and "YG" locomotives (silico manganese steel grade 2)

56 springs bearing, front truck, for "YP" locomotives (silico manganese steel grade 2)

All items to conform to I.R.S. Specification No. R-8/50 with corresponding No. 1 and 2 of 5/52 and 6/53 respectively. Immediate delivery is required. The closing date for receipt of tenders is 10 a.m. on February 23.

Tenders should be addressed to the Director-General, Supplies & Disposals, Shahjahan Road, New Delhi 2. A set of the tender documents including conditions of contract and drawings, may be inspected in Room 801 at the Export Services Branch, Lacon House, Theobalds Road, W.C.1.

The Special Register Information Service, Board of Trade, Export Services Branch, states that the United Kingdom Senior Trade Commissioner at Karachi has reported that the Ministry of Industries, Department of Supply & Development, Government of Pakistan, is calling for tenders for :—

Rails 75 lb. section "R" B.S.S.F. to be in standard length	B.S.S. II medium manganese quality in standard length of 27 ft.-42 ft. rising by 3 ft.	144 tons
Fishplates for the above rails	B.S.S.-47 (shallow type) for 75 lb. rails section "R" B.S.F.F.	6 tons

The closing date for the receipt of tenders is March 1.

Tenders should be enclosed in two envelopes; the first should bear the tender, number, date of opening and address and the second should bear only the address of the Director-General of Supply & Development, Frere Road, Karachi, without any indication that a tender is enclosed.

A set of the tender documents may be inspected in Room 801 at the Branch, Lacon House, Theobalds Road, London, W.C.1, until February 20, after which date it will be available for loan to United Kingdom firms.

The Special Register Information Service of the Export Services Branch, Board of Trade, states that the Director-General of Supplies & Disposals, New Delhi, is calling for tenders as follows :—

(*a*) 800 axleboxes, 10 in. × 5 in., for b.g. coach underframes and 16-ton axle four-wheel wagons but without dust shield

(*b*) 124 axlebox, 10 in. × 5 in., journals complete (b.g.)

(*c*) 2,000 bogie horn cheeks for b.g. bogie coach underframes. 520 horn cheek axleguards, 1 ft. 4 in. long for I.R.C.A. electric trailer coaches and I.R.S. four-wheel stock

(*d*) 580 spindles (solid buffer short case) for BW-87 (steel class II)

(*e*) 300 buffer plungers (round head), all classes

The closing dates for the receipt of tenders are:

(*a*)	February	19 (10 a.m.)
(*b*)	,,	19 (11.30 a.m.)
(*c*)	,,	22 (10 a.m.)
(*d*)	,,	23 (10 a.m.)
(*e*)	,,	24 (10 a.m.)

Tenders should be submitted to the Director-General of Supplies & Disposals, Shahjahan Road, New Delhi.

If there is insufficient time in which to obtain the documents from India, tenderers are advised to submit quotations by letter

and, at the same time, ask for a set of the tender documents to be sent to them, which documents they should undertake to complete and return as soon as possible on the basis of the quotations made by letter.

A copy of the tender form may be examined on application to the Railway Branch of the India Store Department, 32-44, Edgware Road, London, W.2, and the drawing may be seen at the offices of Hodges, Bennett & Co. Ltd., 59-60, Petty France, London, S.W.1, from whom copies may be obtained at a fixed price per sheet.

Notes and News

Workshop Foreman (Millwright) Required.—A workshop foreman (millwright) is required by the Nigerian Railway for one tour of 18 to 24 months in the first instance. See Official Notices on page 223.

Assistant Works Manager Required.—An assistant works manager is required by a South Wales firm manufacturing steel railway rolling stock and general constructional engineering products. See Official Notices on page 223.

Railway Civil Engineering Draughtsman Required.—Applications are invited for the post of railway civil engineering draughtsman required in the London Office of Consulting Chartered Civil Engineers. See Official Notices on page 223.

British Railways Coal, Iron, and Steel Traffic.—British Railways carried 3,239,920 tons of deep-mine and opencast coal last week, including 446,620 tons during the 48 hr. ended 6 a.m. on February 15, the highest weekend figure for two months. During the week ended February 6, 212,733 tons of iron and steel from the principal steel works and 293,700 tons of iron ore were conveyed.

Indian Coaches.—Referring to the article in our issue of February 5, describing the coaches built for the Indian Railways by the Swiss Car & Elevator Company, we regret that it was not made clear in this article that the lighting generators are of J. Stone & Co. (Deptford) Ltd.'s own type made at their Deptford works, and that the holes of the mounting bolts were spaced to suit the dimensions of Brown-Boveri generators in the interest of interchangeability.

Western Region Boxing Tournament at Birmingham.—Railwaymen representing all grades of the staff of the Western Region will compete at Birmingham Indoor Sports Stadium on February 24, to compete for the Western Region Boxing Championship titles. This will be the first occasion that the championships have been staged at Birmingham, and nearly 50 bouts have been scheduled. Tickets are obtainable from Mr. D. L. Pride, District Operating Superintendent, Snow Hill Station, Birmingham.

Institute of Transport: Visit to France.—Preliminary arrangements have now been made for members of the Institute of Transport to visit France from Monday, May 3, to Wednesday, May 12. The provisional programme provides ample opportunity for personal observation and study, and for group inspection of transport works and installations. There will also be visits to places of industrial, historic and scenic interest. During the course of the visit members will be the guests of the French National Railways at an informal reception by M. Armand and of Shell Française and the Société Générale des Huiles de Pétrole B.P. at dinner. Those hoping to take part in the visit should notify the secretary of the Institute of Transport, Mr. F. W. Crews, by postcard, marked Continental Visit, giving member's name and membership grade, and stating if to be accompanied by wife and whether intending to travel with rail or air party.

Stonehall & Lydden Halt to Close.—Stonehall & Lydden between Shepherdswell and Kearsney on the Faversham-Dover line of the Southern Region will be closed on and from April 5.

Closing of Kimberley and Watnall Branches, London Midland Region.—Kimberley West Goods Depot and Watnall Public Wharf, London Midland Region, closed on February 1.

O.E.E.C. Collaboration with European Conference of Ministers of Transport.—The Council of the Organisation for European Economic Co-operation has agreed to arrangements for collaboration between the Organisation and the European Conference of Ministers of Transport, set up in October, 1953, to ensure the maximum use and rational development of European rail, road and water transport. Monsieur Robert Marjolin, O.E.E.C. Secretary-General, has written to the Belgian Minister of Communications, who is Chairman of the Council of Ministers of the Conference, to say that the Council is ready to consult the conference on questions of inland transport which might arise in the course of its work. The conference, in return, will consult O.E.E.C. on questions relating to European inland transport of general economic interest. The O.E.E.C. will provide an administrative secretariat at the Château de la Muette, Paris, which will be attached to the secretariat of the organisation, but work under the operational control of the conference and provide necessary working facilities for the conference. The organisation will cover the expenses of the secretariat.

Institute of Transport: Yorkshire Section Annual Dinner.—The annual dinner of the Yorkshire Section of the Institute of Transport was held on Tuesday, February 9, at the Great Northern Hotel, Leeds. The President of the Institute, Mr. John Elliot, responded to the toast of "The Institute of Transport" which was proposed by Major Geoffrey H. Kitson. The chairman of the Section, Mr. R. Barr, presided.

London Midland Region 1954 Boxing Championships.—At Wolverhampton on February 13 British Railways, London Midland Region, staged a boxing competition for the champions in ten weights for 1954 Six of the winners came from Lancashire.

Accident in Nile Delta.—Twenty-eight persons were killed on January 30 when a Cairo-Alexandria diesel express train ran into a crowd which had gathered at Kafr-el-Zayyat Station in the Delta to see President Neguib. The President, who had been visiting inhabitants of a nearby village whose homes had been destroyed by fire, was about to return by train to Cairo. A large crowd surged across the tracks to catch sight of him when the express came through at speed.

Manchester Deansgate Goods Station to Close.—The London Midland Region will close Manchester Deansgate Goods Station, on and from Monday, March 29, as a rail connected depot. Traffic previously forwarded from or received at Deansgate will be handled at one or other of the

Sir Brian Robertson in the North Eastern Region

At York Carriage & Wagon Works on a recent visit, accompanied by Mr. H. A. Short, Chief Regional Manager (left and Mr. S. C. H. Fossett, Works Manager

OFFICIAL NOTICES

The engagement of persons answering Situations Vacant advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

WORKSHOP FOREMAN (MILLWRIGHT) required by the NIGERIAN GOVERNMENT RAILWAY for one tour of 18/24 months in the first instance. Salary, etc., according to qualifications (*a*) in the scale £750 rising to £1,035 a year, with prospect of pensionable employment or (*b*) £807 rising to £1,115 a year on temporary terms with gratuity of up to £150 a year. Outfit allowance £60. Free passages for the officer and his wife. Assistance towards the cost of children's passages or grant of up to £150 annually for maintenance in the U.K. Liberal leave on full salary. Candidates should have served an apprenticeship as a millwright in a railway, locomotive builders or heavy engineering workshop and have had seven years' experience on the maintenance, repair and installation of machine tools, as well as compressors, electric overhead and steam cranes, small generating, pumping and similar plant. Write to the CROWN AGENTS, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2C/30391/RA.

VACANCIES for ASSISTANT MECHANICAL OFFICERS, Rhodesia Railways. Applications are invited for Assistant Mechanical Officers for the Mechanical Department for duties in workshops or on the running side in charge of locomotive, carriage and wagon maintenance. Applicants must have served a recognised pupilage or apprenticeship on a railway and subsequently had drawing office, workshop, process planning or running maintenance experience in a supervisory capacity. The minimum qualification is the standard required for admission by examination as Associate Member of the Institute of Mechanical Engineers or accepted equivalent. Age about 28 to 35 years. Salary scale £900 basic rising by annual increments of £40 to £1,460 per annum, plus cost of living allowance now applicable at 20 per cent on basic salary. The commencing salary may be higher than the minimum, dependent on age, qualifications and experience. Avenue of promotion is to the District Grade on basic salary scale of £1,350—£50 annual—£1,750. There is a pension fund, and certain allowances are applicable. Applications, together with full particulars of training, subsequent experience, education and technical qualifications, etc., to be forwarded to the CHIEF MECHANICAL ENGINEER, Rhodesia Railways, P.O. Box 703, Bulawayo, Southern Rhodesia.

GUAQUI LA PAZ RAILWAY.—Assistant accountant. Qualifications: Man who has passed intermediate examination of recognised accountancy body preferred. Knowledge of railway accounts an advantage. Preferably single between 28/35 years of age. CENTRAL RAILWAY.—Traffic Learner for training as an official. Single. Between 21 and 25 years of age. Good general education with transportation experience either practical or theoretical. Knowledge of Spanish language preferable but not essential Apply SECRETARY OF THE PERUVIAN CORPORATION, 144, Leadenhall Street, London, E.C.3.

RAILWAY SIGNALLING AND COMMUNICATIONS INSTALLATION AND MAINTENANCE. A practical guide, especially intended to help Signal Inspectors, Installers, Fitters, Linesmen, Draughtsmen, and all concerned with installing and maintaining Signal, Telegraph, and Telephone Equipment. 416 pp. Many illustrations. Cloth. 8*s*. By post 8*s*. 6*d*. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

MILD Steel Plates, below works price. Large tonnage available. 5/16 in. thick. Immediate delivery.—PIKE BROS. (IRON & STEEL) LTD., Colnbrook, Bucks. Phone 175.

RAILWAY CIVIL ENGINEERING DRAUGHTSMAN required in London Office of Consulting Chartered Civil Engineers. Applicants should give full particulars of qualifications, experience, age, etc., and state salary desired. Replies, which will be treated in confidence, to be addressed to Box "FE/54," c/o 95, Bishopsgate, E.C.2.

GOVERNMENT OF PAKISTAN. Ministry of Communications (Railway Division). TENDER NOTICE. 54/1860/1/S. Tenders are invited for the supply of the following material to the North Western and Eastern Bengal Railways:—

1. FISH BOLTS AND NUTS:
   (*a*) 5 in. × $\frac{1}{2}$ in., 124,680 Nos. (126 long tons).
   (*b*) 4 in. × $\frac{1}{2}$ in., 46,200 Nos. (31 long tons).
2. DOG SPIKES:
   (*a*) $5\frac{1}{2}$ in. × $\frac{5}{8}$ in. × $\frac{1}{2}$ in., 1,230,300 Nos. (429 long tons).
   (*b*) $4\frac{1}{2}$ in. × $\frac{5}{8}$ in. × $\frac{1}{2}$ in., 800,000 Nos. (246 long tons).
   (*c*) $4\frac{1}{2}$ in. × $\frac{1}{2}$ in. × $\frac{1}{2}$ in., 500,000 Nos. (141 long tons).
3. ROUND SPIKES:
   $5\frac{1}{2}$ in. × $\frac{1}{2}$ in. dia., 980,300 Nos. (441 long tons).
4. BEARING PLATES:
   For 90 "R" F.F. Single Rail canted, 178,200 Nos. (1,096 long tons).

N.B. At the time of the actual placing of the order, item 4 may be cancelled while the quantities against items 1 (*a*), 2 (*a*) and 3 may be reduced by 84,184 and 260 long tons respectively.

Tender documents including instructions to tenderers, tender form, schedules of requirements, specifications, drawings and standard conditions of contract can be obtained from the office of the Director-General Railways, Railway Division, Ministry of Communications, Karachi; General Manager, North Western Railway, Lahore; General Manager, Eastern Bengal Railway, Chittagong; High Commissioners for Pakistan in London, Ottawa, and New Delhi; Embassies of Pakistan in Washington, Paris, Tokyo, Brussels and Bad Godesberg on payment of Rs.100/- for each set which amount will not be refunded. Tenders in sealed covers superscribed "Tender for Rail Fittings" should be submitted direct to the DIRECTOR-GENERAL, RAILWAYS, Ministry of Communications, Railway Division, Government of Pakistan, Karachi, so as to reach him before 11 hours on April 3, 1954, at which time and date, tenders will be opened in the office of the Director Civil Engineering, Railway Division, in the presence of any tenderers who may care to be present. The Director-General Railways reserves to himself the right to reject the lowest or any tender without assigning any reason therefor and may accept any tender in part in or whole. This call is being made simultaneously in Pakistan, Belgium, Canada, France, West Germany, India, Japan, U.K. and U.S.A.

RAILWAY Draughtsman-Surveyor required by large firm railway contractors, applicants must have ability to carry out site surveys, plot same in layout form to good working scale (detailing for manufacture of turnouts, etc., done by other draughtsmen); capable of full use of theodolite and level; duties to include site supervision of contract in progress; age 25-30 years; man with British Standard Specification experience preferred; conditions of employment to include provision of car, all travelling and general expenses; five-day week on rota system; comprehensive superannuation scheme, etc. Write in first instance, stating age, experience and salary required, to Box 93, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

AN ASSISTANT WORKS MANAGER is required by an expanding South Wales Firm manufacturing Steel Railway Rolling Stock and General Constructional Engineering Products. Applicants must have had a thorough works training and experience in the construction of prototypes for mass production and be able to control men and fix wage rates. Good prospects for keen, energetic man. Full particulars in confidence to Box 112, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

GOVERNMENT OF PAKISTAN. Ministry of Communications (Railway Division). TENDER NOTICE. 54/1860/S. Tenders are invited for the supply of the following material to the North Western and Eastern Bengal Railways:—

(*a*) Medium Manganese/Carbon Steel Flatfooted Rails:—
   (*i*) 90 lbs. R—25,735 long tons.
   (*ii*) 75 lbs. R—4,731 long tons.
   (*iii*) 60 lbs. R—3,000 long tons.
(*b*) Fish Plates:
   (*i*) for 90 lbs. R—71,640 numbers equivalent to 677 long tons.
   (*ii*) for 60 lbs. R—22,400 numbers equivalent to 112 long tons.

Note: The requirements against items (*a*) (*i*) and (*b*) (*i*) above may be reduced at the time of the actual placing of the order by 11,456 long tons and 394 long tons respectively.

Tender documents including instructions to tenderers, tender form, schedules of requirements, specifications, drawings and standard conditions of contract can be obtained from the office of the Director-General Railways, Railway Division, Ministry of Communications, Karachi; General Manager, North Western Railway, Lahore; General Manager, Eastern Bengal Railway, Chittagong; High Commissioners for Pakistan in London, Ottawa, and New Delhi; Embassies of Pakistan in Washington, Paris, Tokyo, Brussels and Bad Godesberg on payment of Rs.100/- for each set which amount will not be refunded. Tenders in sealed covers superscribed "Tender for Rails and Fish Plates" should be submitted direct to the DIRECTOR-GENERAL RAILWAYS, Ministry of Communications, Railway Division, Government of Pakistan, Karachi, so as to reach him before 11 hours on March 29, 1954, at which time and date, tenders will be opened in the office of the Director Civil Engineering, Railway Division, in the presence of any tenderers who may care to be present. The Director-General Railways reserves to himself the right to reject the lowest or any tender without assigning any reason therefor and may accept any tender in part or in whole. This call is being made simultaneously in Pakistan, Belgium, Canada, France, West Germany, India, Japan, U.K. and U.S.A.

DUE to plant expansion important wagon builder desires Sales Engineer for Belgian Plant. Work to consist of estimating costs both material and labour, preparing detailed technical specifications, writing quotations, and general sales work both written and by personal contact. Spanish and French languages desirable. Technical training essential. Preference given to man willing to travel. Excellent future for man with right combinations of sales and technical abilities. Minimum age 25, maximum depending on experience but preferably not over 45. Excellent salary depending on qualifications. Reply Box 89, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

BOUND VOLUMES.—We can arrange for readers' copies to be bound in full cloth at a charge of 25*s*. per volume, post free. Send your copies to the SUBSCRIPTION DEPARTMENT, Tothill Press Limited, 33, Tothill Street, London, S.W.1.

existing six goods stations in Manchester, and arrangements have been made which should ensure there will be no inconvenience to traders whose traffic has hitherto been dealt with at Deansgate. Adequate facilities and train services exist at the other Manchester goods stations.

Test for London Tourist Guides.—Candidates for the "Registered Guide" badge awarded by the British Travel & Holidays Association undergo the Association's course of training for guide lecturers and take a final examination. The latter comprises a practical test and a general knowledge paper, which recently included a question on the deepest Underground station (Hampstead).

Sugar Beet Conveyance in Scotland.—Eleven thousand wagons were required to convey the season's harvest of sugar beet to Cupar, Fife, for processing at the sugar beet factory. The Scottish Region states that from October 5, when acceptance of sugar beet at the Cupar factory began, until the close of the season on December 26, 108,794 tons of sugar beet were conveyed in 10,992 wagons. This is an average wagon load of 9·9 tons. The comparative figures for last year were 83,256 tons in 8,612 wagons, an average wagon load of 9·6 tons.

Fares Reduced on British Railways Boulogne Day Trips.—For the day excursions to Boulogne operated by British Railways during the summer the return fare from Victoria this year is reduced from 67*s*. 6*d*. to 60*s*. and from 45*s*. to 40*s*. from Folkestone. Tickets will be available daily except Saturdays and Sundays from June 18 to October 1. Passengers holding day excursion tickets travel by the regular cross-Channel steamer leaving Folkestone at 11.20 a.m., and arriving back at 8.10 p.m. Those from London travel on the 9 a.m. boat train from Victoria, and arrive back in London at 10.30 p.m. Passports are essential.

Broom & Wade Limited.—The consolidated total income of Broom & Wade Limited for the year to September 30 last was £659,644 (£542,282) and the net profit, subject to taxation of £303,099 (£256,739) but after all other charges, to £516,846 (£432,159). As already reported, the total ordinary distribution is maintained at 14 per cent, preference and ordinary dividends require £52,246 (£49,560) and the board has transferred £140,000 (£125,000) to reserve and £16,000 (nil) to dividend equalisation account, leaving £232,566 (£227,065) to go forward. Consolidated net current assets were £1,780,868 (£1,544,306).

Popularity of Camping Coaches in Scotland.—Last year the demand for railway camping coaches during the holiday months exceeded the number available. British Railways, Scottish Region, accordingly have added 10 additional vehicles at new sites throughout Scotland, including Aboyne, Carr Bridge, Rhu, Tyndrum, and West Kilbride. Other places in Scotland where camping coaches are situated are Aberfeldy, Appin, Arisaig, Fortrose, Glenfinnan, Kingussie, Loch Awe, Morar, and Strome Ferry. Let on weekly or fortnightly

tenancies from April until October, the coaches are designed to provide sleeping accommodation for six; they have a spacious living room and kitchen complete with cooking facilities, crockery, and utensils, at rentals of £7 or £12 10s. a week according to season. Camping apartments in specially converted station buildings are also available at eleven sites in Scotland ranging from the Lothian Coast to Central Perthshire and Deeside.

Agricultural Implements : Scotland to Italy by Ferry Service.—A consignment of farm binders is being sent in special wagons to Italy via the Dover-Dunkirk train ferry. The binders, manufactured by a firm of Perthshire farm implement makers, are similar to the power-driven binders used by hill farmers in Scotland and are to be used by rice growers in the plain of Lombardy.

Fine for Unauthorised Moving of Crossing Gates.—A car driver who helped four companions to move some padlocked level-crossing gates after he had failed to rouse the crossing keeper, half-an-hour after midnight, was fined £5 recently at Norwich. He was further ordered to pay £1 15s. 1d. damages, costs amounting to 18s., and an advocate's fee of £5 5s. He pleaded guilty to being concernd with others unknown in damaging the gates and the red signal lights on them. It was stated that a train was in the section at the time.

Cafeteria at Swindon Station.—The refreshment room premises on the down side at Swindon Station are to be converted into a modern cafeteria to serve hot and cold meals and light refreshments. There will also be a separate bar. The present counter is to be moved to allow space for a larger circulating area, and the room will be refurnished and redecorated, and modern lighting installed. When this part of the scheme is finished, it is intended to modernise the refreshment facilities on the up side of the station.

Forthcoming Meetings

February 24 (*Wed.*).—Permanent Way Institution, at the Headquarters of the British Transport Commission, 222, Marylebone Road, N.W.1, at 6.30 p.m. Debate: "That tamping gives better track than measured packing." For: Messrs. K. S. Martin and A. Savill. Against: Messrs. H. C. Orchard and F. Lloyd.

March 3 (*Wed.*).—Institution of Railway Signal Engineers, at the Railway Institute, Derby, at 5.45 p.m. Paper on "Testing of mechanically interlocked lever frames," by Mr. H. G. E. Taylor.

March 3 (*Wed.*).—British Railways, Southern Region, Lecture & Debating Society. Afternoon visit to Ford Motor Works, Dagenham.

March 3 (*Wed.*).—British Railways, Southern Region, Lecture & Debating Society, in the Chapter House, St. Thomas' Street, S.E.1, at 5.45 for 6 p.m. Paper on "The Author and the Artist, their contribution to publicity," illustrated by lantern slides, by Mr. F. D. Y. Faulkner, Public Relations & Publicity Officer, British Railways, Southern Region.

March 4 (*Thu.*).—British Railways, North Eastern Region, Hull District Stationmasters' Discussion Group. Open Meeting at the Paragon Institute, at 7.15 p.m. Paper on "Automatic train control and other safety measures," by Mr. L. W. Hattey, Assistant to Chief of Operating Services, B.T.C.

March 5 (*Fri.*)—Institution of Locomotive Engineers, at Grosvenor House, Park Lane, London, W.1, at 12 noon for 1 p.m. Annual luncheon.

March 5 (*Fri.*).—The Railway Club, at 57, Fetter Lane, London, E.C.4, at 7 p.m. Paper entitled "The wars of the carriers 1896-1954," by Mr. Kenneth Brown, President.

March 8 (*Mon.*).—Institute of Transport, at 80, Portland Place, London, W.1, at 5.45 for 6.15 p.m. Paper on "Continental traffic—a look forward," by Mr. L. H. K. Neil.

March 8 (*Mon.*).—Historical Model Railway Society, at the Headquarters of the Stephenson Locomotive Society, 32, Russell Road, London, W.14, at 7 p.m. Paper on "The London & South Western Railway," by Mr. C. Hamilton Ellis.

March 9 (*Tue.*).—South Wales & Monmouthshire Railways & Docks Lecture & Debating Society, in the Angel Hotel, Westgate Street, Cardiff, at 6.30 p.m. Paper on "The operation of district controls," by Mr. L. W. Ibbotson, assistant to Operating Superintendent, British Railways, Western Region, Paddington, W.2.

March 10 (*Wed.*).—Railway Students' Association, at the London School of Economics & Political Science, Houghton Street, Aldwych, London, W.C.2, at 6.15 p.m. Paper on "Operating economics in practice on the railways," by Mr. E. W. Rostera, Operating Superintendent, British Railways, Eastern & North Eastern Regions.

Railway Stock Market

The strong upward movement in stock markets has been followed by a sharp reaction, particularly in the industrial sections. Selling was not heavy, though there was a certain amount of profit-taking after recent big gains. On the other hand, buying has been cautious this week. Sentiment has been affected by a number of factors. In the first place the very hopeful views on the Budget received a setback because the supplementary estimates recently announced seem to suggest that the current financial year, which has six weeks to run, cannot finish with more than a very moderate surplus. Tax reductions, therefore, can only be expected to be moderate.

The British Transport £80,000,000 issue of 4 per cent stock at £101 per £100 of stock was regarded in the City as a suggestion that a reduction in the bank rate in the near future is unlikely. British Funds therefore tended to ease this week, though the rather lower prices are bringing in buyers at the time of writing. One hope which still persists in markets is that income tax will be reduced by 6d. and this would mean higher prices for British Funds and fixed-interest securities generally.

On the other hand the question is being asked whether most industrial shares at their current levels do not already discount rather fully the possibility of somewhat higher dividends.

There has been a fair amount of business in foreign rails with Manila Railway debentures attracting more attention at higher prices. Compared with a week ago, the "A" debentures have risen from 77 to 80 at the time of going to press, while the "B" debentures moved up from 66 to 70. Manila Railway preference shares remained at 8s. 4½d., but on the other hand, the 1s. ordinary shares came back from 4s. 1½d. to 3s. 6d.

Dorada ordinary stock was dealt in at close on 60, while the 6 per cent debentures marked 90½. Paraguay Central "A" debentures have changed hands at 11 and Costa Rica ordinary stock at 8⅝. Chilean Northern 5 per cent debentures reacted after their recent rise, and showed dealings down to 27.

White Pass stocks lost ground following the new issue news, although this was not generally unexpected. A placing has been arranged of $1,100,000 of 5½ per cent unsecured loan stock (1963-78), for which a London Stock Exchange quotation is expected. The stock will carry the right to take up three common shares for every $100 of stock at prices ranging from $16 (Canadian) per share in 1955 to $20 per share in the three years ending September 30, 1961. The company's existing 5 per cent convertible debentures have come back from £98 to £95, and the common shares were $27, compared with $27¼ a week ago.

Canadian Pacifics have receded from $46¾ to $45¼, but the 4 per cent preference stock kept at £67½, and the 4 per cent debentures rose on balance from £88¾ to £89½.

United of Havana stocks have not been affected by the annual report, the second income stock having changed hands around 42½ and the consolidated stock around 6⅝.

Antofagasta ordinary stock receded from 9 to 8¾ and the preference stock from 41½ to 41, while business around 45¼ was recorded in the 4 per cent debentures.

Mexican Central "A" debentures kept firm at 82½. San Paulo units were dealt in around 5s. 4½d. Taltal shares were around 14s. 3d. and Nitrate Rails shares moved back from 19s. 9d. to 19s. 3d.

Road transport and allied shares generally kept steady, apart from British Electric Traction 5s., "A" deferred units, which after their recent big advance showed a reaction from 44s. 3d. to 41s. West Riding shares have been firm at 27s. with Lancashire Transport 48s. 9d. and Southdown 28s. 9d.

As was to be expected, leading engineering and kindred shares reflected the general reaction in stock markets. The biggest fall has been in T.W. Ward, which after the advance to £5 after the news of the 100 per cent share bonus decision, have fallen back to 90s. This resulted from the directors' statement that future dividends must depend on financial results and that the share bonus should not be taken as indicating that more cash will necessarily be paid out in dividends. Tube Investments came back to 66s. 3d., Vickers at 50s. 9d. were 9d. down on balance and Ruston & Hornsby eased from 47s. 9d. to 46s. 6d. Guest Keen eased to 51s.

Among shares of locomotive builders and engineers, Beyer Peacock at 32s. 3d. lost part of their advance. Vulcan Foundry have been maintained at 22s. 9d., Birmingham Carriage were 30s. 7½d. and Hurst Nelson remained at 42s. North British Locomotive lost a few pence at 14s. 3d. Wagon Repairs 5s. shares were 11s. 9d. xd and Charles Roberts 5s. shares 18s. 9d. Gloucester Wagon 10s. shares kept at 17s. 3d. Bigger dividend hopes in the market put G. D. Peters 5s. shares higher with business up to 25s. 7½d.